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PHOSPHORUS

A Shining Example of an Accidental Discovery

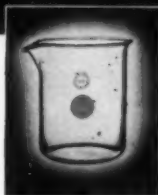
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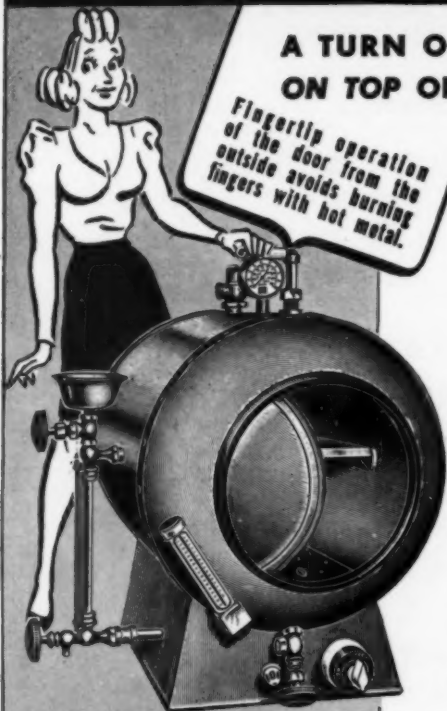
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The Paint and Varnish Industry After the War

Maximilian Toch, F.A.I.C.

Past President, The American Institute of Chemists

HE WHO prophesies much is likely to be right occasionally. This is not a prophecy, but is based on precedent, deduction, and inference.

In the last twenty-five years the paint and varnish industry has changed completely. The only synthetic resins which existed in 1920 were bakelite and cumar. The principal oils at that time were linseed oil, Perilla, China-wood oil, and soya bean oil. Today there are more than twenty varieties of bakelite resins, and in addition polystyrol, vinylites, various phenolics, modified phenolics, alkyds, urea, methacrylates, and many other more or less well-known materials which are used in making paint and varnish.

Among the solvents and oils that are used today are hydrogenated naphthas, dehydrated castor oils, oiticica, high-iodine fish oils, etc.

None of these materials existed in 1920, or if they did, they were laboratory curiosities. With the exception of about three per cent of the total imports of China-wood oil for 1941, which was grown in the United States,

Scientific Attachés for British Embassy

C. S. Garland, A.R.C.S., B.Sc., F.I.C., president of the Institution of Chemical Engineers, is reported to have recommended that after the war, in the interests of peace and of British industry, every embassy should maintain a scientific attaché, whose duties will be to keep watch on the progress of scientific research capable of development for war. He suggests that a scientific general staff be created with liaison officers attached to the various embassies. These would study the progress of scientific research in the countries in which they were stationed, and report to those who decide foreign policies.

wood oil has practically ceased to exist. If anybody thinks that as soon as the last shot is fired we are going to be able to import all the wood oil needed, he will be very much mistaken because the 1600 square miles in China where the tung oil trees

flourished in the wild and semi-wild state have been eroded, captured and shot over by the contending armies. Many of these trees have, of course, been destroyed, and much of them has been used for fuel purposes. The nuts themselves, which normally have fallen off the trees have, in many instances, been gathered and used instead of coal, a very good but a very expensive substitute. Ever since the shortage of China-wood oil has been felt an excellent substitute has been found in Brazil, which is known as oiticica oil, but no large quantity can be expected from Brazil unless new trees have been planted. Dehydrated castor oil and polymerized linseed oil have also made an excellent substitute, but we have had to look to South America for this castor oil.

The only country besides the United States that grows any quantity of flax seed is Argentina, and a scarcity of bottoms and the difficulty of obtaining export licenses has kept us from our usual supply. There are political reasons also. At this writing only fifty per cent of the oil used in 1941-1942 can be obtained by the paint manufacturers.

After the last war the three principal pigments which were used were white lead, zinc oxide, and, after 1920, titanium began to come in. Today we have antimony oxide, and a great variety of titanium pigments, all of which are produced in the United States, but already there is an im-

pending shortage of Ilmenite ore so that the outlook for a sudden rejuvenation of the paint industry, even after the European war is over, is not any too bright.

The amount of paint that will be used after the war is enormous. There will be something like twenty million tons of shipping, turned back to their original owners, all of which will have to be repainted as the ships at the present times are painted in two shades of gray. The railroad companies have not been able to spare much of their equipment for repair and repainting, and their consumption of paint, etc., will be tremendous. Buildings and construction of all kinds are already sadly in need of repainting in the United States, and when, as, and if there will be sufficient materials to go around, consumption of paint for both public and private use will be very large. This may result in a mad rush for the purchase of raw materials, and unless a ceiling price will continue after the war inflationary prices will take their place.

As far as the export business of the United States is concerned, Central and South America have been holding up in their purchases for a number of reasons. First, the difficulty in obtaining raw materials; secondly the difficulty in obtaining export licenses; thirdly, the difficulty of securing bottoms. The container situation is desperate. The bottom situation is eas-

THE PAINT AND VARNISH INDUSTRY AFTER THE WAR

ing at present and may become better as we go along, but large quantities of paint will not be readily obtainable unless the raw material situation improves. Vast quantities of paint will be needed in Africa and in Europe, and a strange situation may develop on account of lend-lease for we may find that the payments for our exports will be financed with our own money. The one thing to fear more than anything else is the rise of price due to scarcity of raw materials. I am reliably informed that in the Near-East, linseed oil is used in large quantities as an edible oil. For centuries Southern Russia, Bulgaria, and Rumania have used linseed oil for cooking purposes, and as long as that obtains the use of paint in those countries will be secondary.

The law of demand and supply is inexorable and any hectic buying when the supply is small and the demand is large upsets markets and prices rise far beyond the real value of the merchandise. A good example is the present day condition of second-hand automobiles. The demand is so great that an automobile which cost \$600 new before the war is selling today at \$1,000 in a second-hand condition.

After the last war it took practically three years for linseed oil and China-wood oil to come down to their normal prices and the table which I herewith append was made up from figures taken from the *Oil, Paint and Drug Reporter*, to which I am indebted for this information.

LINSEED OIL

(Carload Lots)

	1919		Per Gallon 1920		1921	
	H.	L.	H.	L.	H.	L.
January	\$1.55	\$1.45	\$1.77	\$1.77	\$0.80	\$0.74
February	1.45	1.45	1.77	1.77	.70	.62
March	1.50	1.45	1.77	1.74	.67	.65
April	1.58	1.50	1.84	1.74	.67	.55
May	1.63	1.58	1.74	1.67	.75	.60
June	1.98	1.63	1.67	1.60	.76	.73
July	2.22	1.98	1.60	1.50	.80	.71
August	2.22	2.22	1.50	1.35	.77	.73
September	2.22	1.86	1.22	1.20	.77	.73
October	1.86	1.72	1.22	1.07	.70	.67
November	1.77	1.72	1.02	.80	.69	.65
December	1.87	1.77	.84	.80	.69	.67
Year	2.22	1.45	1.84	.80	.80	.55

CHINA-WOOD OIL

On February 4, 1905, the price was 6 @ 6¼c.; October 18, 1911, 8¾ @ 9c.;
1913, 7¼ @ 7½c.; 1918, July 32c.

(In Barrels)

	1919		Per Pound 1920		1921	
	H.	L.	H.	L.	H.	L.
January	\$0.26	\$0.25	\$0.23	\$0.22½	\$0.11½	\$0.09½
February	.26	.20	.26	.23½	.10½	.09½
March	.22	.18½	.25	.23½	.10½	.09
April	.20	.18½	.25	.24	.10	.08½
May	.21	.18½	.24	.22	.15	.09¾
June	.23	.22	.22	.16	.15½	.10¾
July	.24	.23	.19½	.18	.15½	.14
August	.24	.23	.18½	.16½	.17	.15
September	.24	.23	.18	.17½	.17	.12½
October	.24	.23	.18	.16	.14½	.13½
November	.24	.23	.16½	.12	.15½	.14½
December	.24	.22½	.13½	.11½	.14½	.13
Year	.26	.18½	.26	.11½	.17	.08½

Buyers should remember that when the war is over in Europe, the amount of raw materials on hand cannot increase, inasmuch as Europe furnishes very few of the things that we need. When the war is over in the Far East, materials which the paint industry

has been using for varnishes will not be available in any great quantity for immediate shipment. It is going to take several years before the paint and varnish industry will again be stabilized. History will repeat itself.

No Swimming in Alizarine Lake

John Kieran

Reprinted from "One Small Voice" in *The New York Sun*, August 24, 1913

Benefits still accrue from the firm use of soap and water. It was recorded here how an oil painting—a landscape with cows—hanging over our fireplace was cleaned with soap and water, how a vanished cow (on canvas) was recovered thereby, and how the painter thereof, one G. Whitley, through the kindness of corre-

spondents, was identified as an English artist who exhibited at the Royal Academy in 1868 and 1869.

On top of all that, there has come from Dr. Maximilian Toch, famous expert in chemical analysis of paint and paintings, a copy of his absorbing book "Paint, Paintings, and Restoration." Dr. Toch is not an artist

or an art critic. He is a chemist. He peers at paintings through a binocular stereoscopic microscope. He turns violet rays and X-rays on the works of old masters, makes micro-photographs of the canvases, discovers what damage has been done through the ravages of Father Time or the bad judgment of the artist in mixing his paints, and suggests possible means of repairing the damage or preventing further deterioration.

A Regular Eye-Opener

This casual inspector of art museums sat down with Dr. Toch's volume, "Paint, Paintings, and Restoration," and was almost jarred out of an upholstered chair by the following paragraphs in the introductory chapter:

"For years many artists and those interested in painting have deplored the fact that the pigments of the present day are the cause of the rapid deterioration of oil paintings and that the colors used by the old masters insured permanence.

"All persons who make statements of this kind are ignorant of the facts and have based their opinion on hearsay. As a matter of fact, the old masters had nothing like the permanent pigments that we have today. To be sure, they had fewer pigments and painted in a more or less direct manner; none of them used very brilliant colors—and any one who thinks that the old masters painted nothing but permanent pictures is very mistaken.

"There is not a painting by an old master in existence that has not been restored, relined, retouched or repainted time and again. I wonder what Rembrandt would say if he could come back to earth and see 'The Anatomy Lesson' and 'The Night Watch,' and whether he would recognize his own handiwork.

"Not a single painting of Leonardo da Vinci is in good or even fair condition. 'The Virgin of the Rocks' has been restored and repainted time and again until today it is in such a condition that it is doubtful whether it could ever be restored to a semblance of its former state."

Going Overboard

Badly shaken by that blast, this unnerved reader plunged ahead and soon went overboard in Alizarine Lake. Dr. Toch has it that one reason for the deterioration of paintings is "too much ignorant experimentation and too little knowledge of the interaction of pigments and their mediums." To keep young artists out of trouble, he suggested a "simplified palette" of ten colors, to wit: White, Red, Vermilion, Scarlet, Orange, Lemon, Green, Blue, Black and Alizarine Lake.

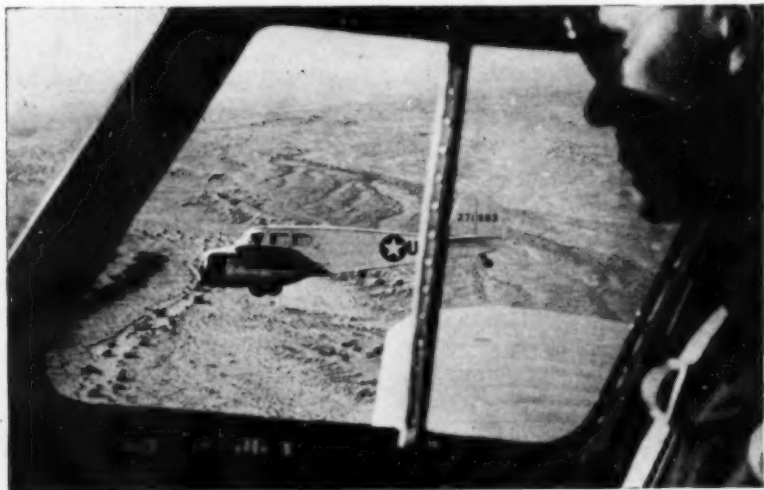
If "Alizarine Lake" hadn't been in such company this baffled bystander would have tried to look it up on some large map of the world. But under the circumstances, the *Encycl. Brit.* was consulted. The result was formi-

dable. Among other things, the Encycl. Brit. stated of "Alizarin" (that's the way the Encycl. Brit. has it):

"A vegetable dyestuff prepared from the roots of the madder (*Rubia tinctorum*) . . . crystallizes in red prisms melting at 290 degrees Centigrade . . . value as a dyestuff depends on its power of forming insoluble compounds (lakes) with metallic oxides."

Frankly, that left the matter of Alizarine Lake still a bit muddy in the

mind, but the amateur opinion here is that Dr. Toch has something in that "simplified palette" plan for young artists. Take golf, for instance. Most players would do better on the links if they threw away half their clubs. And the man who has too much money never learns to use a dollar judiciously. "Simplify, simplify, simplify!" said Henry David Thoreau. It's still a good idea. It would work wonders in this country if somebody were elected to public office on that platform.



Photograph by courtesy of Robert A. McGlinchey, Air Corps, Army of the United States

Metallurgists Create New Alloys for Aviation

Metallurgy = A Major Branch of Chemistry

Gilbert E. Seil, F.A.I.C.

Technical Consultant, E. J. Lavino and Company, Philadelphia, Penna.

IN GLANCING over the membership list of THE AMERICAN INSTITUTE OF CHEMISTS the lack of names of metallurgists, ceramists, and other classifications of chemists, who are employed in the metallurgical industry, is immediately apparent particularly to one who is acquainted in this branch of chemistry. The fact that these chemists are not members of THE AMERICAN INSTITUTE OF CHEMISTS is an indictment of the Membership Committee and must be viewed with alarm.

As a matter of fact, the metallurgical industry in tonnage produced, in raw materials used, in money invested and in total business in dollars, is probably the largest chemical industry. One branch of the metallurgical industry alone, the iron and steel branch, produces staggering tonnages of finished products and uses even greater tonnages of raw materials.

Since it is customary in the chemical industry to state production figures in pounds, the following tabulation will be most interesting:

Metals Used in the Steel Industry in the U. S. A.

<i>Materials</i>	<i>Net Tons</i>	<i>Pounds</i>
Steel ———	90,000,000	180,000,000,000
Manganese —	600,000	1,200,000,000
Silicon ———	200,000	400,000,000
Chromium —	150,000	300,000,000
Nickel ———	125,000	250,000,000
Molybdenum —	30,000	60,000,000
Tungsten —	10,000	20,000,000
Vanadium —	3,000	6,000,000
<hr/>		
TOTAL ———	91,118,000	182,236,000,000
<hr/>		
Magnesium —	350,000	700,000,000
Aluminum —	750,000	1,500,000,000

The figures in the above table do not include all of the alloying metals which are produced in the United States, but only those which are used in the manufacture of alloy steels and in plain steels. Besides this there are large quantities of tin, zinc, cadmium, etc., used for plating and coating. If we add to this the total tonnage of other metallurgical industries, such as copper, zinc, lead, chromium, aluminum, magnesium, and forget the noble metals, gold and silver, the figures become so great that except for

the petroleum industry the tonnage figures are greater than the poundages in the chemical industry.

It is interesting to note that Dr. R. B. Sosman of the Steel Corporation has written an article in *Mining and Metallurgy* entitled "Why Mineral Technology Schools Should Offer Courses in Low and High Temperature Chemistry". It might be well for the men in the chemical industry who consider 400°C. or 500°C. as a high temperature to read this article and to realize that many metallurgists are working at temperatures up to 2000°C. as daily routine.

It is also interesting to note that the fundamental chemistry used in metallurgy is the same fundamental chemistry which is used in organic, physiological, agricultural, and the other branches of low temperature chemistry. As a matter of fact, the only truly immiscible reagents are found in metallurgy. There are practically no immiscible solvents at low temperatures in which there is not some solubility of one solvent in the other so that the coefficient of distribution and, therefore, the mass action constants are seriously disturbed by slight temperature differences. In metallurgy there are no cases where a slag is soluble in metal or a metal is soluble in a slag. Therefore, under set conditions the law of mass action, coefficient of distribution, etc., hold and accurate calculations can be made with assurance.

Another interesting point of view in comparing metallurgical chemistry with chemistry that is carried out at normal temperatures is that the relative state is always approximately the same. The range above the melting points of the reagents in both cases is approximately of the same order.

As a rule chemists are not versed in the metallurgical art. They consider metallurgy as the art of extracting metals from their ores. As a matter of fact, it is a much broader science and art than this for it entails the beneficiation of low grade ores, and it entails the manufacture and preparation of many raw materials, some of them synthetically, which are important and necessary in the metallurgical industry.

Some of the most important and unusual developments in recent years have occurred in the field of metallurgy and hydro-metallurgy. New methods of separating desired from undesirable mineral bodies have been developed. Various types of flotation have been put into operation with the aid of the organic chemists in furnishing agents which not only coat particles but also which cause froth. The organic chemistry of mono-molecular films is important in the metallurgical field.

When the development of a country is studied, it is found that the chemical knowledge and chemical technology increases inversely as the grade of raw material decreases. This is

METALLURGY—A MAJOR BRANCH OF CHEMISTRY

particularly true in the field of metallurgy. A few decades ago it was impossible to economically recover copper, zinc, lead, etc., from low grade ores. Today ores containing less than 1% of these elements are treated metallurgically to yield finished products at exceedingly low costs in spite of the higher labor wage rate and the tax situation. Ores in the iron and steel division are still high grade. When it becomes necessary to use low grade ore, our technology will be advanced sufficiently to take care of the situation.

Thirty years ago, as a student, it was necessary to choose a branch of chemistry to follow. It was definitely stated that there was very little to be learned in inorganic chemistry, but that organic chemistry was the real field. No regret is expressed for the years spent in studying organic chemistry. They were most helpful in metallurgy, still there is no question that organic chemistry then and now offers as wide and as varied a field as metallurgical chemistry; it is only in the last few years that metallurgical chemistry has been organized and

classified so that cause and effect can be predicted with accuracy.

The importance of the professional chemist in metallurgy has been emphasized during the war effort. It is by his skill that the country has been able to meet the requirements both for war materials and civilian uses.

Examples of the metallurgical chemists' magic are found in the recovery of magnesia metal from seawater, manganese from rocks which can hardly be considered ores, aluminum from heretofore metallurgically useless materials, beryllium from low grade ores, recovery of vanadium from ores containing less than six pounds per ton, etc., indefinitely. Besides these efforts, metallurgists have developed several methods of agglomerating ores for use in furnaces, such as nodulizing in rotary kilns, sintering and briquetting.

A serious effort is indicated to interest the professional chemists in the metallurgical fields in THE AMERICAN INSTITUTE OF CHEMISTS with membership as a professional responsibility.

Edwin Dowzard, F.A.I.C., has retired from his position as chief chemist for the New York Quinine and Chemical Works, Brooklyn, N. Y.

A. Cressy Morrison, honorary member of THE INSTITUTE, has leased an apartment at 67 Park Avenue, New York, N. Y.

Richard L. Cox, formerly assistant dean of the Philadelphia Textile Institute, was made dean to succeed M. Earl Heard, resigned.

William Albert Setchell, professor of botany, emeritus, University of California, died at his home in Berkeley, on April 5, 1943.

I Interviewed a Company Today

Frederick C. Foster

Assistant in Chemistry, Columbia University, New York, N. Y.

THREE years ago, in my first year in graduate school, the industrial companies visited Columbia in the spring in search of men who would finish their graduate work in the summer. Most of the students accepted the first company which offered them a position, provided they did not have some serious objection to the company. This year, the companies visited Columbia in the summer for men who would finish their graduate work by the following summer. Nearly all of my classmates looked over several different companies before making up their minds. In fact, there were so many different companies coming around that after a while some of us quit accepting interviews because it was taking so much time it interfered with our research. We got in the habit of saying, "I interviewed a company this morning," instead of saying that the company interviewed us. This was more or less indicative of our attitude. It was not that we felt important, it was just that we had a chance to look at several companies and pick the one which we liked best.

At Columbia, the Appointments Office acts as a clearing house for the interviews. Industrial firms write to this office and ask if interviews can be arranged on a certain date with the personnel representative of the company and the students of the chemistry and chemical engineering departments. The office then contacts graduate students and arranges a time schedule of interviews. At these preliminary interviews, the company representative may profess an interest in the student and invite him to visit his laboratories or office and be interviewed by some of the chemists in the company. Some chemical firms prefer to do this by letter, and they give no indication of their interest, or lack of interest, in the student at this time. After about fifteen preliminary interviews, I decided which companies I was most interested in, considering, of course, whether or not they were interested in me. I imagine that most universities have a system similar to this. However, an industrial chemist, who finished his graduate work in 1932, told me that such an elaborate set-up was

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certainly not needed the year he finished school.

The first company conducted its second and final interview at its New York office. I considered this a strong objection. Two of the factors most important to me in choosing a company were the type of men who acted as group leaders and department heads, and the type of facilities, including both the equipment and the research set-up. Since I did not get to visit the laboratories, I could not judge the company on these two factors. A friend of mine, who knew the company well, assured me that the company was all right on these considerations. However, I was making what I thought to be an important decision and there is nothing quite so reassuring as to see for yourself, especially when such things are a matter of taste and opinion. One of the most favorable things about this company was the type of work it was doing. It seemed to be long-term research, similar to academic research and probably not routine. The location of the plant was also favorable. Another unfavorable consideration, but not as important as the first one mentioned, was the salary. This was the only company which offered less than what was considered to be the standard salary.

The second company invited me to its plant. I talked to several of the chemists in the organization but I was not allowed to see the laborato-

ries because of the nature of their war work. As I stated previously, it was a disadvantage not to be able to see the laboratories. However, I decided it was more important to talk to the chemists. My impression of the company from the men I met was not entirely favorable. I felt that there was something unharmonious about the organization. I wasn't sure; it was only a suspicion. The desirability of the type of work was about average. The location of the company was the most favorable of all the companies I visited. I liked the section of the country and the climate. I also liked the size of the town, which had a population of about 80,000. The salary was standard.

It is rather difficult to think of something complimentary about the next company I visited. A new research building was just being built, so again I couldn't see the equipment. Most of the employees whom I met, and especially one, impressed me unfavorably. I think that the type of men in a company influenced me, especially in a negative way, more than any other single factor. The salary was standard. The type of work was again average, and the location was undesirable. The only bright spot was that the company was understaffed and there would probably be a good chance for advancement.

The fourth company seemed very desirable to me. Every man I talked to seemed competent and likable. The

library and the equipment in the laboratories were excellent. The location was acceptable to me. It was the only company which offered more than the standard salary. The only drawback was the type of work. I felt that it might be rather routine.

The last company was equally as good as the fourth in regard to personnel and facilities. I also especially liked the research set-up, and the type of research. This company offered the standard salary.

There were some things during my experience of being interviewed which seemed unusual, although they did not influence my decision. Only one company asked me any questions about chemistry. This same company was the only one which asked for a transcript of my graduate work. Another company was the only one which asked for references. Only one company required a birth certificate for entrance into its plant. One of the companies gave me a very thorough physical examination. All of the others, as one fellow put it, seemed only to be concerned that your body was warm when you reported for work. This discrepancy of emphasis among the different companies seemed strange to me.

It was interesting to compare my

impression of the preliminary interview with my final impression of a company. I must admit, that in every case, my final decision about a chemical firm was not influenced at all by the preliminary interview. As an example, the preliminary interview which most favorably impressed me was the company which I liked least of all in the final analysis. In another preliminary interview, the personnel man knew so little about the company that he had to refer to a folder to find out what type of work the company was doing. Yet this company was one of the two which I liked best.

I don't know how representative my opinions are. Some of the factors which I thought were most important might not be emphasized at all by other students. And some of the things which I thought were unimportant may be the deciding factor for someone else. One classmate of mine at Columbia really had the subject simplified. He thought the only thing to consider was the location of the laboratories. He picked the section of the country he liked best and looked for a company in that area. The thought occurs to me now that perhaps he should have written this paper. It would have been shorter.

The *United States Government Manual* has been revised up to May 15, 1943. The volume lists principal officials and gives a detailed break-

down of the emergency war agencies. It may be purchased from the Superintendent of Documents, Washington, D. C. at a cost of \$1.00.

The Positions College Girls Choose

Jane West

Undergraduate, Smith College, Northampton, Mass.

I BRING you the undergraduate point of view on methods of interviewing, and also I bring you the woman student's impressions of interviewers. I speak not only for myself, but for many others—the senior chemistry majors and graduate students who are the prospective chemists from Smith College.

The woman's liberal arts college has changed completely because of the war. Last Fall, there was a feeling of restlessness and irritability on the campus. Many students felt that they should be out in the defense plants doing something constructive to further the war effort. Many felt that they should be doing something, anything, rather than to be sitting around on a peace-time college campus. Soon, however, they saw the folly of throwing away fourteen or fifteen years of schooling without competing the sixteen year course and four years of valuable college training. We were told that we were but loaves of bread in the oven of education, that if we left before our four years were over, we would be half-baked—

and who can use half-baked bread? We were told that we cannot hope to win this war if our intellectual front is demolished. With these thoughts in mind, the girls have thrown themselves into their work, seriously and intently. There is no sitting around on an iron-fenced, ivy clad, peaceful pre-war campus; acceleration and hard work prevail; the fences have been given to the scrap metal drive. It is indeed a war-time campus.

Today women are being taken into industry, more than ever before. We feel, that it is our opportunity to prove once and for all, to those who still hold prejudices, that we can and will do as good a job, if not better, than the men. The senior chemistry majors are literally straining at the leash, then, to get out into the job for which they are best qualified, from which they will get the widest experience, learn the most, and do the most for their country. They do not want to go into the laboratories and take over. They do not feel they know it all. If they appear so at first in a preliminary interview to

many in industry, it is not superiority but merely "putting up a good front", an attempt to make a good impression. There is not one girl with whom I have discussed this problem frankly who does not want to go into her new position to learn.

Since last September, eighteen chemical companies have sent representatives and thirty-four additional companies have written in regard to employing students. This is more than ever before. Perhaps some may feel that this has gone to our heads and made us cocky. The best way to show that this is not the case is to tell what a great chemist said to me at Christmas time, "You should get your Ph.D. You *would* make a good chemist." We realize that we are but fledglings and not experienced scientists. All of us want to go on with our studies, but for the duration we want to gain experience in the industrial laboratories. With the men being called out of the analytical and control laboratories, we will forego our longing to get into research and we will do what little we can to help. The importance of interviews by the companies on our own ground is great. With so many concerns interested in college women, we must be able to get something out of even the preliminary interviews to enable us to decide whether we are interested in a particular company or not.

The Vocational Office has as its main purpose the placing of every

senior where she will be of the most use, and where she will gain the widest experience. It provides private offices for interviews. All a chemical company has to do is to write to the Vocational Secretary, and she will round up all the chemistry majors, who will be ready for jobs in the Spring, for fifteen to twenty minute interviews. Booklets containing our credentials, letters of recommendation, introduction, pictures, and a transcript of our grades are sent to any company interested in us.

Our impressions of the many interviews we have had, both at college and at the companies, are varied. In general, however, there are two types of interviewers: The frank type and the subtle type. We like the frank type better. The man who openly lays his cards on the table and is obviously sizing us up gains our confidence much more quickly than the subtle man. The frank type is more of a challenge to us to live up to what he wants and expects us to be. The subtle man who is roundabout in sizing us up, who attempts to psychoanalyze us, is not half as stimulating as the man who puts us on our mettle. Examples: The frank type—the interviewer who asks us questions about our work and tells us about the jobs we would be qualified for. The subtle type—the anthropologist who interviewed me as a biochemist, and instead of telling me that he would have no use for me,

THE POSITIONS COLLEGE GIRLS CHOOSE

stalled me off; and the interviewer who was not interested in an alien but who told her to go on with graduate work.

Since time is an important factor, we sometimes feel that it would help if a chemist who knew the jobs could come and line us up; or the interviewer could be a technically trained personnel man. We want to know about the work, primarily, rather than the outline of the company. We thought one company was on its toes and had the time factor in mind, when it sent reams of literature ahead on the general plan of the company so that we could read it before the interview. We were, therefore, disappointed when the interviewer merely repeated the literature.

In general, the interviewer should attempt to keep somewhere on schedule with even these preliminary interviews, for as one professor said, "They want you for jobs that you won't be qualified to take, if you don't get out of that Vocational Office and come to classes."

Interviews at the companies have left us with varied impressions. There are two extremes that we meet: One, a repetition of the preliminary inter-

view with merely an outline of the plan of the company; Two, a very specialized bout of technical questions. Technical questions are all right to see how the prospective chemist can think and apply his fundamental training, but specialized quizzing is both unfair and unnecessary.

Two other extremes were noted. The men who were bowing and scraping to get any help they could, and those who were condescending because they had never hired women before and did not want to now. The happy medium between both of these sets of extremes, preceded by the frank, technically trained personnel man, in every case sold us on the job.

The answer, then, to the question, "Why did you pick that particular company?" was in nine out of nine cases, "Because the people there were the nicest to me and took a personal interest in my work and my aptitude for the particular position." We feel that working only for weekends to come, despite having money in the bank, is a waste of time. We are all going into jobs where the people are the most congenial, and where they feel that we as individuals will best fit the particular positions offered.

R. K. Carleton, F.A.I.C., is teaching an ESMWT course two evenings a week in Westerly, R. I., to men employed in the large textile plants there, in addition to his teaching work at Rhode Island State College.

These chemists are the queerest people! There is one in Canada who says he discovered something one-hundred times sweeter than sugar and then he forgot to give us her name.

—Rays of Sunshine.

We Hire Discriminately

Lois W. Woodford, F.A.I.C.

Assistant to the Administrative Director

American Cyanamid Company, Stamford, Connecticut

The selection of scientific personnel is an investment in talent. The interviewer may be likened to a purchasing agent, who determines whether an individual is a good investment by an evaluation of his ability, his experience, and his personal characteristics. The careful choice of an employee is much more satisfactory than indiscriminately hiring people and later releasing those who are unsatisfactory, but a critical shortage of good personnel always increases the danger of employing misfits. The responsibility for using the "highest skill" of an employee falls on both the employer and the applicant.

THE search for a position follows the pattern of a development and sales program. (1) The product to be sold. The ability of the applicant must be taken to market. The applicant must make a direct application to a company. This may be a brief letter which concisely states his qualifications. It may be a personal ap-

pearance at the personnel office of the company, or it may be a reference from another branch of the company, or from the main office, or from someone known to the company.

(2) The occupations bureau of educational institutions are another source of contact. Companies often become acquainted with the chemistry department staff, and appoint interviewers or scouts to talk to seniors or recent graduates.

(3) Advertising: One may place an advertisement in the papers, or may answer an advertisement. The advertisements in trade journals cover those with specialized experience.

(4) The employment clearing house of associations augmented by attendance at scientific meetings.

(5) U. S. Employment Service. This is increasing in value for the professional man.

(6) Employment agencies and other commercial agencies with technical departments.

Application Forms

Application forms which are similar in their general structure are used by all the large companies. These

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forms, designed to achieve an orderly presentation of data, contain the following main heads.

Data

(1) Position applied for corresponds to "commodity offered".

(2) Personal background, with photograph—physical property.

(3) Training: Degrees, majors—chemical analysis.

(4) Experience—performance report.

(5) References—satisfied customers.

(6) Interview—appointment interviewer's report—sample.

(7) Salary requirements—offering price.

To return to the first sale's approach which represents the prospectus, the applicant will write a letter of application. This letter may take two forms. The first may be a very brief request for the standard form of application. This is the direct approach, and in many ways the best, because it saves effort and time. The second form of an introductory letter may include a concise statement, neatly and clearly expressed.

The careless letter or sloppily filled-out application form has lost many an opportunity for a personal interview. The letter should be typewritten, preferably, because it is easier to read and is less personal. Green or purple ink, for example, is "off the beam". Material attached to this letter may include a list of publications;

general reference letters beginning "To whom it may concern . . ." (but photostats should be sent rather than original letters) and a photograph.

Concerning photographs, much defamatory evidence has been presented by the wrong kind of photograph. Some snapshots are almost libelous and are actually damaging to the best interests of the applicants. Examples of these unfortunate pictures in our files include a faded newspaper clipping; a one-armed man—the other was cut off when the picture was trimmed to eliminate someone else; the camouflage picture—the shadow among the trees; the man's hat style, where the man's face is completely shaded; the young lady in the class prom. gown; the too-candid camera shot; the elaborate pose resembling Rodin's "Thinker".

Data to be given on the applicant's record should include the position being applied for; the personal background; the training: degrees, majors, special-interests. In the case of a recent graduate a transcript of the college record is helpful, but this is not very useful where the applicant has had five to ten years of experience. The experience record, if any, should be given. Summer jobs are important. The scope of activities in previous jobs should be given where this does not reveal the previous employer's business details. The reason for leaving the position is also

important information.

In other words, sufficient information should be given to enable the reader to determine whether the applicant's qualifications correspond broadly to the vacancy. References may include (a) The college appointment bureau, from which the company can get an impersonal record, and a confidential file on the applicant. (b) The head of the applicant's major department. Often the personnel officer will write to a member of the staff whom he knows personally. (c) The supervisor of summer employment, and the superior in the previous employment. (d) Personal friends, clergy, doctor, dentist, neighbor, and similar references are of secondary usefulness. They usually say "nice little girl . . . worthy parents", etc.

The best references are usually the short letter, the telegram or telephone call. The brief letter is likely to give an unconditional recommendation, or its opposite. A long letter usually contains several paragraphs in which the professor or someone tries to tell the whole truth without hurting the chances of the "nice boy" or girl who has rather a poor record. He enlarges on outside interests—John was a leader in the Glee Club, but he is really saying, "I do not think too much of his scientific ability nor has he the capacity to develop as his experience broadens".

The interview should be regarded

as a sales service call. The applicant must not regard himself as a peddler, but as a salesman presenting his product. The interview may be secured by appointment, or it may be by reference from another unit of the company (which can also represent "buck-passing"). Sometimes an applicant just walks in "cold" but finds that the timing was propitious, and that there is a vacancy in which he may fit.

The reception which an applicant receives depends on the available opening, or need for the product, and good-will building, by way of reciprocal relations. One never knows that some day the shoe won't be on the other foot. The interview serves two purposes. It gives the company a chance to make a composite evaluation of the applicant, and it gives the applicant an opportunity to see the general working conditions, determine the living conditions in the community, obtain an idea of the equipment, the facilities, and the personnel. Interviews may include a visit to the "works" which is most satisfactory from the applicant's point of view.

The employment clearing house interview is on neutral territory, where the applicant will have the disadvantage of not knowing much about the company itself. The college interview leaves the interviewer at a disadvantage because it is held on the applicant's home territory and the student is less self-conscious.

The interview in the company or

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at the plant may be compared to an appointment with a purchasing agent, where the product which the applicant offers will be evaluated. The human relation factors are important here, but no psychic powers are comparable with analytical tools. Nevertheless, the interviewer must use a "mental camera" and play hunches. At American Cyanamid we do not rely on the judgment of one interviewer, but the applicant "runs the gauntlet" among several people. However, we endeavor to make the interviews as pleasant as possible, and we show every consideration to the applicant.

After the general discussion and arrangements in the personnel office, the applicant may be referred to a group leader, who may have an available opening, or to the head of the analytical laboratory. The applicant will be quizzed on technical subjects, the school record which will indicate his text-book knowledge, and on his experience. The applicant may be referred to the "excavator" type of interviewer who applies methods of revealing hidden characteristics; or he may be referred to a man experienced in some field in which the applicant claims familiarity. He may also be referred to the director of the division in which the opening exists. Then the applicant goes back to the personnel office, where he receives his travel expenses, promises, or other information.

Each interviewer will determine the qualifications of the applicant or, in other words, study the properties of the product during a ten to twenty minute exposure. This requires keen attention on the part of the interviewer, who must be alert to the applicant's personality, poise, mannerisms. The interviewer will notice the applicant's disposition—is it mild, quiet, talkative? He will watch for initiative, for aggressiveness, deciding whether this latter is simply forceful or unpleasant. He will try to draw out the applicant to discuss his interests, ambition, choice of field. He will evaluate the applicant's appearance, his details of grooming. Is he appropriately dressed? Neat? Is the general impression favorable? What is the applicant's intelligence? His general information? His common sense?

Interviewers are instructed to report unfavorably on the "near genius" who is worse than an unstable emulsion, and like a strategic metal has a limited field of usefulness. In the research laboratory he may be applicable as a "specially tailored" product. The "lone eagle" type is also a "rare element" who has no place in a cooperative group.

The composite opinion of all those who have interviewed the applicant is then recorded, and the personnel officer determines from these records whether the applicant is suitable for the available opening; how he com-

pares with the other candidates, if any; and if the salary which he expects is within the budget range. At the present time, we might say that it is a seller's market rather than a buyer's market.

The interview in the company gives the applicant an opportunity to breathe the "atmosphere of the place". However, the average applicant expects the interviewer to ask all leading questions and he acts like a cat in a strange garret. Thus he misses an opportunity to do himself justice. He is more at home and at ease during a college interview.

The personnel officer must remember that every interview is an opportunity to make a friend for the organization, even though no job is available at the time. The personnel officer must not use the time of the laboratory staff for unnecessary interviews. The headquarters for all interviewing is in the personnel office, where the applicant's papers are checked for details or errors. The applicant must be kept moving without long waits. The luncheon provides a chance to the applicant to meet the personnel of the company, to ask questions of the escort informally, and to get a bird's-eye view of the layout. After the informalities of the luncheon, the applicant is ready to meet the director of the division to discuss employment considerations; salary requirements, and the date when he will be available. Some-

times the offer of the position will be made immediately, or its decision will be promised by a certain date; perhaps the decision will be made later, but the applicant will get a rather definite idea whether he is being considered favorably.

The composite evaluation of the different interviewers and contacts which the applicant has made in the company will give a fairly accurate measure of his qualifications. The system of having several interviewers avoids the pitfalls of the possible personal prejudices of one interviewer coloring the picture. If an opening is not immediately available, the data on the applicant is on file for a later review should the situation change and a job become open. Several interviewers protect the applicant from the frequent fault of "overselling".

It is important for an applicant to remember that because an interview is requested it does not necessarily mean that there is an opening. The timing is important. Sometimes one just drops in at a personnel office at a lucky time, when the right job is available.

We are careful to see that all courtesies are extended to applicants. Correspondence is acknowledged, and blank forms are sent. We keep promises regarding notification of decisions. We write personal letters of rejection, if necessary, with a series of variations to suit the individual case. In return we appreciate recip-

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rocal courtesy, such as the withdrawal of an application when the applicant is no longer interested. As a matter of fact these withdrawals are seldom received, less than one per cent of the applicants notify us if they decide to take another position. We keep a permanent "dead storage" file of applicants. This is enlightening when a "new" applicant appears.

We keep appointments on time, or send notice of cancellation, if necessary, and we send advance notice when we invite applicants to come at their convenience and at our expense. Our general policy is to pay travelling expenses when we request the interview. We have had occasional experience where in this seller's market, the student "goes for the ride to enjoy the scenery" without any interest in obtaining a position with us. At no time do we want an applicant to reveal confidential information, or to make indiscreet statements which

will reveal his former employer's private business.

More women chemists than ever before are being employed, and in general they want to "do research in an organic laboratory" but certainly they do not want to work in an analytical laboratory. The present rushing of them by talent scouts, etc., has gone to their heads like cocktails. They forget that they will have to learn the hard way.

Men in general are interested in the fields of research, development, sales, sales service, administration, and production, but they regard bench work or analytical work as a stepping stone, and they are willing to start in the analytical laboratory as the best place to secure a broad knowledge of a company's products. Women must realize that they, too, have to start in the analytical laboratory before they have sufficient knowledge to advance further.

A shortage of science teachers in American high schools is causing concern. Many science teachers have taken positions in war industries while others have gone into the armed services. Professor Willard Waller, Columbia University, has made a study of conditions faced by the public schools as a result of the shortage of teachers. He fears that the present generation of students will grow up with a sub-standard education, which will be a handicap to them in adult life. He suggests that draft-boards

defer younger men teachers and that salaries be raised to keep competent teachers in the schools.

The Society of the Sigma Xi announces research grants to eleven scientists for the continuation or completion of research which otherwise might have to be discontinued. The funds, totaling \$2,240, came from contributions made by Sigma Xi members. The award committee consisted of Dr. Harlow Shapley, Dr. Hugh S. Taylor, and Dr. L. C. Dunn.

The Story of the Odd Discovery of Phosphorus*

Ivor Griffith, Ph.M., Sc.D., F.A.I.C.

President, Philadelphia College of Pharmacy and Science

TAX Collector Bauduin had much spare time on his hands, for the thrifty citizens of the little community of Grossenhayn, in Saxony, paid their tax bills promptly and thereby avoided a penalty. Much of this spare time was spent in earnest gossip in the shoemending shop of one Freuben, an eccentric cobbler who had a local reputation as a dabbler in the dark art of alchemy.

One can surmise, then, the visionary schemes in which this peculiar pair indulged. These were the days when the search for the Quintessence used up the Alchemist's time and efforts. Four elements they already had, namely earth, fire, water and air, and the fifth—the quintessence, still remained. Freuben, over his last, discussed with the idling Bauduin the possibility of obtaining this fifth essence by combining together the four known essences in an alembic, and then distilling.

Thus they conceived that they could obtain the spirit of the world (*spiritus mundi*).

Calx they dissolved in spirit of nitre, the resulting solution they evaporated to dryness, and the residue exposed to air so that it might absorb "humidity." A second distillation was resorted to, and thus was obtained in pure form the long-sought-for quintessence—the virile, potent "humidity."

To prove that "seasons change but human passions never," they placed on sale as a panacea for all human ills, their "captured humidity" at a price of 12 *groschen* per *loth* (approximately sixty cents per ounce) and afflicted rich man and beggar man eagerly came to buy. The alchemists became rich—they had indeed found the philosopher's stone—the *spiritus mundi*.

Freuben threw away his last and purchased a decadent villa and spent his *spiritus mundi* in its reconstruc-

*Reprinted through the courtesy of the Journal of The American Pharmaceutical Association.

THE STORY OF THE ODD DISCOVERY OF PHOSPHORUS

tion. Bauduin did not come up for réélection for the first time in many years, and a new tax collector was duly installed in office. Instead he cultivated music and also continued experimenting. One night during the course of his experiments Bauduin dropped and broke a cumbersome lambik containing some of the calcined nitrate of lime, and was surprised to find it luminous in the dark. He also observed that this luminosity came after exposure of this material to sunlight. He promptly recognized the importance of his discovery, and taking some of the "inspired earth" to Dresden City he found Kunckel, a royal pharmacist of that city very eager and anxious to learn all about the queer substance.

The ethics of those days seemed to be almost as flexible as they are today, for history tells us that Kunckel promptly visited with Bauduin so that he might extract from the "ignorant dabbler" the formula for his essence. But Bauduin was wary, and when the visitor spoke of essence and retorts, Bauduin extravagantly discussed cadences and rhapsodies. Finally under some pretext or another, Kunckel induced the alchemist to leave the room for a few minutes, and during this interval the royal pharmacist managed to purloin a fragment of the precious "inspired earth" by nipping it with his finger nail.

Thus it was that Kunckel managed to get material and information with the aid of which he worked out a process of preparing the luminous earth, which Bauduin very discreetly had called Phosphor (or the light-bearer). Incidentally, it is told that when he eventually did produce some of this material, he courteously sent a little morsel of it to Herr Bauduin as a slight memento of the instructive and interesting musical evening that the alchemist had given him.

Later the ethical Kunckel found that another alchemist had "gone him one better", and had produced not "inspired earth" but the very inspiration itself—the real phosphor. Brandt, of Hamburg, an old physician-alchemist, had indeed produced from human urine the element itself, and Kunckel anxiously sought to obtain an interview with the old gentleman, probably expecting to repeat his light-fingered experiment. However, he confided the news to a friend bearing the fitting name of Kraft, and the latter immediately justified his name by taking a special post to Hamburg and purchasing outright from Brandt the secret art and mystery of preparing phosphorus. This he did clandestinely and Kunckel was hoist with his own petard.

However, it is told that Kunckel later on managed to inveigle Brandt, through an intermediary named

Homborg, to furnish him also with the precious formula. In payment thereof he furnished Brandt with a curious little device, then quite novel, consisting of a vari-colored little house tenanted in turn by a wooden man and wooden lady—the former, as usual, staying indoors when the weather was stormy, and emerging when the sun was in smiles, one of those toy weather forecasters that are quite as reliable as the more modern and elaborate government establishments that have the same purpose of existence.

And thus it was that Kunckel after all became possessor of the much desired secret and soon established himself as the first practical manufacturer of phosphorus.

This is the story of the discovery of phosphorus, replete with oddities and incongruities—but it is interesting despite the fact that it rather disillusionizes the believer in the chivalry and honor of other days. Surely the world is getting better if written codes of ethics be any criterion.



W. T. Read Adviser on Chemist Draft Status

W. T. Read, F.A.I.C., dean of the chemistry department of Rutgers University, has been granted a leave of absence to serve as executive officer of the advisory committee to the National Roster of Scientific and Specialized Personnel Branch of the War Man-power Commission, charged with furnishing local draft boards with information about qualified chemists and chemical engineers, to utilize the scientific abilities of our trained men to further our production for war.



The State of Georgia has appropriated \$16,000 a year to The Herty Laboratory, Savannah, Georgia.

Dr. Fred C. Koch to be Honored by Chicago Chapter

The Chicago Chapter of THE AMERICAN INSTITUTE OF CHEMISTS each year gives a testimonial dinner honoring some outstanding chemist. Last year this honor was conferred on Dr. V. N. Ipatieff.

The Testimonial Dinner Committee of the Chicago Chapter, under the chairmanship of Dr. Frank B. Burns, U. S. Gypsum Company, has just now announced its selection of Dr. Fred C. Koch, research chemist of Armour and Company and retired head of the department of physiological chemistry of the University of Chicago as the chemist to be honored this year. The testimonial dinner honoring Dr. Koch will be held October first.

The Tradition of the Arts of Dyeing

M. D. C. Crawford

Research Editor, Fairchild Publications, New York, N. Y.

AMONG the earliest works written on dyes in the United States is "Experimental Researches Concerning the Philosophy of Permanent Colors" by Dr. Edward Bancroft, (1814 second edition), a citizen of the United States, but a member of the Royal Society of London. He quotes from the great Chaptal's "Elements of Chemistry":

"The art of dyeing is one of the most useful and marvelous that we know, and, if there was anything that was able to inspire a noble pride in man, it is this art. Not only has it procured for us the means of following and imitating nature in the richness and brilliance of color, but it makes it possible to surpass nature in giving more brilliance and greater fixity to the fugitive colors in which nature reclothes all of these bodies which compose the universe."

Chaptal, among the pioneers of modern chemistry, and a follower of the great Lavoisier, and his pupil, Berthollet, is here referring to the dyes which western Europe had received from the Orient. But he also marks the dawn of modern organic

chemistry and the beginning of what we call today the synthetic dyes.

In the 16th Century, there was in London an innkeeper devoted to exploration, the famous Richard Hakluyt, and he wrote to a Mr. Hubblethorne, who was about to undertake a journey to Persia, the following advice:

"That the cloths of the realm, (England) have no good vent, if good dyeing be not added: Therefore, it is much to be wished the dyeing of foreign countries were seen to the end that the art of dyeing may be brought into the realm in the greater excellence. Look for anil plants, and ways of preparing it!"

Jean Batiste Colbert, Minister of Louis XIV, died in the year 1683, a misunderstood man. But at an earlier date, he had said: "All visible objects are distinguished or rendered desirable by their colors, which must not only be beautiful to give commercial currency to the stuffs, but also good that their durability be equal to that of the fabrics to which they are applied."

I will now attempt to trace, briefly,

the history of these colors, which had so aroused the minds of western Europe following the age of discoveries in the late 15th and early 16th century.

Color is a necessity, a spiritual need, almost as great as the necessity for food. It is an infinitely more potent necessity than the need for clothing. Color precedes clothing in most cultures outside of the very farthest north, where the absence of fur clothing would mean the absence of life. It precedes cloth by many thousands of years. In all civilizations, we must recognize the fact that the spiritual demands are of equal significance with the material needs. All primitive peoples are faced with the necessity of defending themselves from the invisible powers of evil which surround them, and in this defense, they employ the powers of magic. This leads to all manner of body painting, scarification, and tattooing, and the use of various ornaments which are really amulets or protective devices. Jewelry and cosmetics, to use modern terms, are older than clothing or any form of cloth. Blood is a very important factor in this spiritual materia medica, and consequently, red is a predominant color among all peoples, ancient or modern, primitive or civilized.

At a very early stage in all cultures these magical symbols become formalized into traditional designs of increasing complexity. Color becomes

of more and more importance in these patterns, and the esthetic senses are thus developed. Here we have the origin of the arts, the potent force we refer to as "fashion".

This subject covers far too large an area for anything but the briefest reference at this time. But, may I call your attention to tattooing among the Polynesians, where it was carried to the status of a major art. It was the attribute of distinction, the heraldic device of nobility, and no one could enjoy the privilege of a cannibalistic feast unless he was tattooed, and, hence, worthy of such company. Tattooing also protected the individual from the wandering spirit of the individual who had so graciously, if unwillingly, furnished the substance of the feast. Tattooing is a very painful and tedious process. It requires great skill in its application and vast endurance on the part of the individual to be decorated. It is, by no means, confined to the Polynesian Islands. It occurs in many parts of the world, at many different periods of time, and our own ancestors from the British Isles (particularly the northern part), were known to the Romans as "picts", or "painted people". The well-dressed gentleman of England, at the time of Caesar and before, was covered over with blue designs rubbed into punctures in the skin with a flint tool into which was rubbed the anil from the woad plant.

Primitive peoples are not without

a great ingenuity in the matter of color. I will cite only one incident of how far their knowledge and skill went in this direction. Von Humboldt, the great scientific explorer of the 19th Century, describes how the savages of the upper Orinoco, (still terra incognita, an almost unknown world), change the color of the feathers in the macaw. These birds are captured, the feathers plucked out at the roots of the wing, and into the skin is rubbed the blood of a small frog, "*rana tinctoria*", or "the colored frog". When the feathers grow in again, they are not the original grayish colors, but are brilliant yellows and reds. These feathers are then plucked out to be used in the ceremonial headdress of these people. (It has always astonished me that our milliners have not learned something from these primitive artists). When the feathers grow again, they continue to be the brilliant yellows, oranges and reds, without any mixture of the blues and greens of the natural state of the bird. In conclusion, I might point out that the Upper Paleolithic peoples, who, during the Glacial Age inhabited the caves of France, Central Europe and Spain, painted the walls of their caves with brilliant representations of the animals they hunted, using sixteen different pigment colors. There is little doubt that they used these same colors in painting their own bodies, and perhaps the inner surfaces of their fur

garments. This was twenty, perhaps forty, thousand years ago. This is enough, it seems to me, to prove the fact that color, the desire for color, the necessity for color, is of great antiquity and great potency in inspiring that mass of inventions, discoveries and experiments to which we give the generic term of material culture or civilization.

The fact that we are what we call "modern" has, in no sense, changed this necessity for color. A world without color is an impossible conception. It would be a world of mental darkness, of frustration, and no other gifts of civilization could, in any wise, compensate us for the loss of chromatic values. We should go mad in a colorless world.

Today, our youths are clothed, for protective reasons, in colors that are neutral, and when the fortunate day arrives, when with victory they will lay aside their uniforms, they will return to normal life with an enhanced demand for color, and the world of fashion will blossom forth, as it did after the last war, in brilliant colors as some compensation for the years of drabness. Will we be ready for this chromatic demand? What has yesterday to offer us?

As we look over the history of the textile arts, we find that the richest color palettes, curiously enough, occur in two geographically widely separated regions: One defined by the name of Persia, (perhaps we should

say southwest Asia). Persia was the meeting ground of the peoples of the Near and Far East. It was an area between the cultures of India, China, Mesopotamia, and the Mediterranean basin. It was, at one time, the road over which the silks, the cultivated continuous filament white silks of China, passed into our civilization. Ideas came from the East; other ideas moved from the West to the East. It was a fruitful exchange. But it was not silk that gave us color. I do not know of any pre-historic dye that was entirely developed for silk. Silk culture comes rather late in the textile story. Silk borrowed its colors from wool. Persia was the home of the sheep and the wool-bearing goat. I need only mention such a name as cashmere to bring this within the scope of your own experiences.

We know that even today, with all of our great advances in chemistry, all of our knowledge of the raw materials used, a white animal fiber is still the most sensitive of all materials to dye, and wool is more sensitive than silk. So when the various civilizations that made up the culture of Persia found a white wool and learned how easily it took color, they began to seek in nature, which was then their laboratory, for every substance that would give color. This was an era of great discoveries in nature. It should not escape our attention that, from this same general period of civilization, we have re-

ceived all of our major food plants: Wheat, oats, barley, rice, corn, potatoes, etc., and all of our great natural textile fibers, basts, wool, cotton and silk; also all of our domesticated animals, cattle, camels, sheep, etc., and all of our early metals. I offer this as proof that early man, from the time that he learned of the possibilities of agriculture and horticulture, and the domestication of animals, was an ardent and persistent seeker into the secrets and opportunities of nature. He exhausted the environment open to his investigation. He is to be compared, and not unfavorably, to our great research physicists and chemists of today. He, too, was a seeker.

Now, the great dyes of antiquity from the Old World are well-known to us. The most romantic of these was the juice of several species of conch or murex shellfish found in the Mediterranean. From this juice was produced the famous Tyrian or royal purple of antiquity. I might add that not all the ancient purples were dyed with this priceless essence, because people learned how to make a purple by combining a blue and a red dye, madder and indigo. Indigo was made, and is still made, from the leaves of a plant cultivated for this purpose all through the Orient, and largely in India. It was used as a cosmetic for at least 4000 years. The madder root, cultivated over an enormous area of the East, and later

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in Europe, furnished the red. But there was a crimson or scarlet color that was almost as valuable as the purple. This was developed from the bodies of a female shield louse, which attached itself to the leaves and stems of the teak tree, which belongs to the oak family of Asia-Minor, and to the roots of certain plants found as far north as Poland. Now the name of this insect in Persia was "kermes", and this means "little worm". When this dye material came into Europe, they copied the Persian name in medieval Latin, "vermiculata" or "little worm", and from "vermiculata" has evolved that beautiful French name of "vermilion". The great Republic of Brazil received its name because the Portuguese, in the 16th Century, found dye-wood or Brazil in these new jungles.

There were many other dyes, and there were, undoubtedly, many experiments that were not as successful as those four I have mentioned. But, it is upon these dyes and their combinations that the Coptic, Persian, Byzantine, Sicilian, and later, Italian and French fabrics rest their reputation. Up to the end of the 19th Century, these were the world's principal sources of textile colors. There are men still living who have used them all except the murex or purple.

One of the first interests of Cortez, after his dramatic conquest

of Mexico, was a little female shield-louse, which was cultivated by the Aztecs on a cultivated cactus plant, which yielded a rich crimson dye. This was our cochineal (*coccus-cacti*). From the natives, he demanded cochineal as a tribute, and sent it back to Spain, to the silk and wool dyers of that great country. He also transplanted the cactus plant, and the cochineal insect, and introduced these into Spain, the islands of the Mediterranean, Spanish North Africa, and eventually into the Near East, where in a few years, cochineal largely replaced the native kermes because it was more prolific.

All over the New World, and in fact all over the world in general, there are over 350 plants which yield anil from which a blue dye can be made. Our Indians knew these anil plants from Hudson Bay to Tierra del Fuego. On the coast of Yucatan today a species of murex is gathered, and purple colors are imparted, not only to wool, but to cotton. This would seem to indicate that there had been some cultural connection between the areas of the Southwest, Central America and Peru, and the immemorial cultures of southwest Asia. But this is disproved by every reasonable scientific deduction. The civilizations were distinct, and had nothing to do with each other until they met, in the Sixteenth Century, in the age of

European discoveries.

In Peru, we find, again, a white hair fiber: The alpaca, vicuna, llama, and guanaco really belong to the camel, rather than the sheep family. All are darker in color than our sheep. Some of them are almost black. But on each of them there is a small area of white wool, and thanks to the aid of Dr. Royer, I discovered that light and brilliant colors occur in fibres which contain no pigment and hence, must have been originally white. Here, again, a people found an opportunity to express color and pursued this opportunity with vigor, intelligence, and success, and they found substances in nature that would yield satisfactory and fixed colors; and nature gave about the same answer in each instance. So the basis of dyes in Peru and in Persia, to the best of our knowledge, (and I must confess that our knowledge of the primitive dyes of the New World is much less than it should be and still awaits investigation and research), are almost identical—never the same species, but the same genus, plants, insects, and shellfish were used in both areas. If we had an intelligent lexicon of color, as distinct from weaves, I doubt if any one could tell the difference between Persia and Peru.

I have only time to discuss a single phase of the dyer's art, and I have chosen calico as the sub-

ject. Calico, as you know, is a cotton fabric on which designs are created by various methods, which we now describe as printing, but which would be more truthfully described as painting. Calicoes came from the city of Calcutta, and were originally called "calicuts". They became an object of trade, by water route, after the memorable voyage of Vasco da Gama from Lisbon to Calcutta, in the year 1497. But there are earlier records of calicoes.

Admiral Nearchus, who sailed down the Indus River in the 4th Century B.C., on the orders of Alexander the Great, describes the natives as wearing cotton clothes covered with beautiful representations of floral patterns, and these were, of course, the calicoes of that period. On the walls of the caves of Ajanta, there are represented painted cotton fabrics of exquisite and vigorous designs and colors.

The earliest trade account written in a European language is the famous "Periplus of the Eurythian Sea" (the sphere of the Red Sea), in which the trade routes from the coast of Arabia, Egypt, northeastern Africa, Persia, India and ultimately, China are described. This document is dated somewhat before the middle of the 1st Century of our era, and in it, painted cottons are often mentioned.

In the earliest tombs of Egypt, from Antioch, we find resist dyeing

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on a linen fabric, illustrating one of the romantic incidents in the relationship between Aradnae and the god Bacchus. The drawing is exquisite and graceful. The Egyptians knew little about the dyeing of fabrics until the art was introduced from Asia Minor. But in the famous tomb of Forstat in Egypt, we find many complex and beautiful calico cloths which were imported from southern India, and many attempts at blue and white resist dyeing which were, undoubtedly, of Egyptian origin.

Europe's relationship to the art of calico making is of comparatively recent origin. Our earlier prints, some of which date from the 13th, 14th century, were made with carved wooden blocks, a trick borrowed from the Chinese book making art, but they did not have the fastness of color or complexity of design found in the true painted mordanted and resist cottons of India.

In the year 1744, Father Coeurdoux, a Jesuit missionary in Pondicherry, India, wrote to the General of the Jesuits, residing in France, a full account of this art as practiced by his communicants. He followed the astute practice of asking them questions about their arts just after confession, when he felt that they would be more favorably inclined to accuracy of statement.

I will outline these processes briefly to show that they were by no means simple, for they contained an enormous amount of technical and chemical understanding, as well as artistic merit.

The first problem was to get the cotton cloth ready to take a design. This was done by partially bleaching the material with the use of sun, air, and a judicious mixture of cow-dung in the water. The fabrics were then stretched out and impregnated with sour buffalo-milk. When the fabrics were dry, they were polished so as to give a smooth surface. Then a design was pricked through paper, and the paper placed on the fabric, and rubbed with charcoal. This outline was set with oxide of iron made from iron filings and sour palm wine. Certain parts of the design, which were intended to be red, were painted with a mordant, largely of an alum derivative. The cloth was then dipped in the red dye of the madder root. The cloth would emerge completely covered with the red color, but by repeated washings and bleachings, the red remained in the fabric only on those areas which had been impregnated with the mordant. When the time came to apply the blue, the entire surface of the cloth, except the area that was intended to be blue, was covered with melted wax, with the aid of a stylus. It was then dipped in a cold bath of

indigo, washed, and the wax was removed with the aid of hot water. Then such parts of the blue design, which they wanted to make green, were painted with a dye of yellow from the safflower; and again the whole fabric as carefully washed, and was ready for the delight of man.

I do not claim that this description of mine, or of Father Coeur-doux, or the later description of the learned Pfister, who, a few years ago, wrote a brilliant treatise on this matter, completely explains the exquisite loveliness of the printed cottons of these eras. We have nothing by which we can measure the skills of these peoples. We know something of their chemical processes; we know something of their tools; we know something of the effect that the introduction of painted cottons made on the markets of Europe, and the consciousness of Europe, in the 16—17th centuries. But the manual skills, the traditional understandings, which grew up in the various groups concerned with this art, are beyond our comprehension and outside our experience.

It seems to me that, in our training in textiles, we should make a serious effort to reconstruct these processes, and to train artists and designers, even chemists perhaps, in this knowledge, not to replace our machines with handcraft, but to

clothe the world in rivers of loveliness by laboratory experimentation in design and color, to be later carried out in mass production by our great machines.

I now wish to call your attention to a rather sordid incident in our own history. During the 16th—17th centuries, Indian calicoes had become enormously popular in Europe and in England. It was the first opportunity that people of moderate means had to possess wearing apparel of bright and beautiful colors. Some of the elders, including myself, can well remember when the possession of a single silk dress for state occasions was about as far as the average woman could go. Silk was, and remains, a great luxury. But the introduction of rayon, after the World War of 1914-18, brought a similitude of silk textures within the reach of millions of women. As you may remember, the silk industry put up a rather vigorous protest, particularly in terminology, and the Federal Trade Commission resolved itself into a committee to revise, change and modify the dictionary.

Something like this happened in Europe when cotton was introduced, and the wool, silk, and linen industries, already long established, protested, and protested so successfully, that in the forefront of the 18th Century, it was a crime, punishable by heavy fine, even in some cases by imprisonment, to manufacture, to

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vend, or to wear an all cotton fabric. And so it happened that, when Arkwright gave to the world the beginning of the modern cotton factory, with his first factory in Cromfort, 1774, it was necessary to have a special Act of Parliament passed to make it legal to manufacture all-cotton cloths, spun and woven, dyed and printed in England.

Just outside of the city of Calcutta, along the banks of the Megna River, and about three miles inland, was a particularly rich stretch of bottom land, running for about forty miles, and here there was cultivated a fine, long-staple cotton, the famous cotton of Dacca, and from these delicate filaments, were spun the finest cotton yarns that could be woven on the loom. The Dacca muslins belong in the classification of the world's greatest examples of the skill of human fingers. Some of these yarns were #500, which would mean around 300 miles of cotton yarn to the pound. There are even records of finer counts of yarn, but I have seen examples that were only little short of those here described.

Fortunately, the process was described by a sympathetic Englishman in the year 1851. The cotton was separated from the seeds with the utmost care; each seed was sufficiently combed with the jawbone of a baleen fish, the teeth of

which, being small and closely set, acted as a fine comb. A small quantity of these combed seeds were placed on a flat smooth board, and over them was rolled, skillfully, an iron rod, so that the seeds were separated from the lint without crushing the seeds. The spinning was entirely by hand; that is, not even a cotton wheel was used. The Dacca spinners were young women. They worked only in the early dawn, when there was a proper degree of heat and moisture, and in the late afternoons. The dew on the grass was their humidifying system. It is said that a spinner, devoting the entire morning and afternoon to the spindle, could make about ninety grains, Troy weight, of yarn a month. The price of this yarn was somewhere around 31 English pounds per yard of yarn, or around \$135. a pound of yarn; but the spinners received for this from two to four rupees per week. These cloths were sent to the luxury-loving courts of the Moguls in Delhi, and they were used for the transparent veils for the beautiful houris of the harem, and for the turbans of the magnificent rajahs. Some of these fabrics are said to have weighed 70 yards to the pound of cloth, which could be contained in a cocoanut shell. Mme. Racamier wore Dacca muslin gowns, the fabrics for which cost 60 shillings per yard.

I am no friend to such a waste of labor and skill. I am no friend to the idea that many people should work at a pitiful pittance in order that a few people should have exquisite luxury. But I cite the example of the Dacca muslins to prove how successful human fingers can be when they are trained, and when they follow in a traditional pattern of skill.

It is my hope that our great industries, which have in the last 150 or 200 years done so much to democratize the arts of the past and to bring many types of fabrics, and many methods of decoration of fabrics within the reach of millions and millions of people, who, in other forms of society would have been denied such luxury, will carry on the research in the direction of quality, in the direction of esthetic improvement, so that more and more of the beauties that were once possible only to the few may come within the reach of the democratic civilizations which stretch ahead, and which should begin a new life, and a broader consciousness of life in the decades that will follow our victories. We have conquered the machine; we have conquered raw materials; we have increased the productivity of the unit of labor five thousand fold and more since the genius of western Europe devoted itself to these matters; and these are great achievements. They have

social implications far beyond the understanding of the present political mind, either here or abroad. We have reached a place in our conquest of environment which makes it possible to clothe every human being in this world adequately, if it were not for the constant interruption in these processes through the political blunders which lead to war.

I know and I respect these achievements. They are the bone, flesh and spirit of Democracy; and without these forces, multiplied in every direction, Democracy would be merely an equation in cabinet philosophies, and not a part, a vibrant part, of the life of our times, of the life of the gracious and vibrant future which beckons our genius into new fields of conquest, new opportunities for human service.

But I stand as a special pleader for the gracious things of many yesterdays, and in all modesty and humility, I want to say that these people also served. They added to the sum of human opportunity and human happiness. They gave to the world a beauty and a charm we have never equalled. They have still lessons to teach. In a sense, I represent the ways of history before the bar of modern industrial science. I ask the talented and trained men of modern science to include in the scope of their research, the knowledge which men have been accumulating about fabrics, colors, designs,

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textures and patterns for 10,000 years. The fact that every method of decoration, every technology of cloth, every principle of color we use so largely today was invented in the past is, it seems to me, proof

sufficient that the physicists, engineers, and chemists of today should turn some part of their attention, and some measure of respect, to these ancient achievements.



Cohoe Elected President of International Society

Wallace P. Cohoe, F.A.I.C., has been elected president of the Society of Chemical Industry, an international organization with headquarters in London. Mr. Cohoe succeeds William Cullen, LL.D., chemical consultant of London, who has long been associated with the Nobel Explosives Company, Limited. The Society of Chemical Industry is working toward closer world relations between industry and chemists and chemical engineers. Mr. Cohoe stated that, "a closer understanding between the businessmen and chemists of all nations is vital to world peace and world prosperity".



J. W. Ince, F.A.I.C., professor of chemistry at Rhode Island State College, has been re-elected chairman of the South Kingstown District of the Red Cross for the tenth consecutive year. He is also a member of the War Committee of the College.

Dinsmore Elected Vice-president

R. P. Dinsmore, F.A.I.C., was elected vice-president in charge of research and development of The Goodyear Tire and Rubber Company. Dr. Dinsmore joined Goodyear in 1914, and from 1939 to the present served as development manager for the Company.

Petroleum Resources Exhaustion Denied

Dr. Gustav Egloff, research chief for Universal Oil Products Company, Chicago, and president of the INSTITUTE, in testifying before a joint congressional committee in Washington August 3rd and 4th differed with Secretary of Interior Harold Ickes that petroleum reserves of the United States are headed for early exhaustion. Said Dr. Egloff:—"We've had these predictions of exhaustion of our petroleum supplies for eighty-five years. They began two years after the drilling of the Drake well."

Spoiled Meat Scrap Found in Sausages

Avoid the indiscriminate purchase of sausages, including frankforts and pork sausage, unless the manufacturer's name is known to merit confidence. Unscrupulous manufacturers are using spoiled-meat scrap, disguised by spices and flavorings, in sausages. Hermann C. Lythgoe, F.A. I.C., president of the Association of Food and Drug Officials of the United States, and director of the Division of Food and Drugs of the Department of Public Health of the Commonwealth of Massachusetts, commenting on a recent case, said: "My official work in handling the Massachusetts food and drug law shows a tremendous increase in the use of decomposed meat in the manufacture of sausages. . . . A short time ago, I had a request from the Mayor of a City to send an inspector to that city to confer with him relative to the work of the local board of health and the character of meat served in the restaurants. I am frequently obliged to jump at conclusions and I assumed that possibly the Mayor might have been referring to certain sausages obtained from a factory in a neighbor-

ing city. I therefore sent two inspectors on this work, one to confer with the Mayor and the local board of health in one city, the other to go to the sausage factories in a neighboring city.

"The second inspector arrived at the psychological moment. About ten minutes prior, five barrels of terrifically decomposed beef trimmings had been received. These were confiscated. The shippers represented a partnership of four persons, who were prosecuted, were fined \$25.00 each, appealed, and later each paid a \$25.00 fine in the Superior Court.

"As the outgrowth of this case, two inspectors further investigated the Boston shippers and persons connected with them, resulting in a total confiscation of approximately two tons of bad beef trimmings, bad sausage, and bad meat of other description. All this resulted from my jumping at the wrong conclusion! Incidentally, investigation of the Mayor's complaint showed that conditions in his city were on the whole somewhat better than in other cities."

A recent order from the Office of Price Administration requires descrip-

tive labels giving, in their predominant order, the ingredients of sausages.



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June Meeting

A meeting of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS was held on Thursday, June 3, 1943, at The Chemists' Club, New York, N. Y., at 6:30 p.m. President Gustav Egloff presided.

The following officers and councilors were present: Messrs: S. R. Brinkley, F. G. Breyer, G. Egloff, H. L. Fisher, C. N. Frey, M. L. Hamlin, F. A. Hessel, R. J. Moore, H. S. Neiman, D. Price, G. E. Seil, and F. D. Snell. Miss V. F. Kimball was present.

Upon motion made and seconded,

the minutes of the previous meeting of the Council were accepted.

President Egloff stated that there are a number of fields in which THE INSTITUTE should be active. These include keeping track of legislation which affects scientific people; the patent situation; and unionization of professional men. Dr. Seil remarked that many states have laws to the effect that unless there were a chemical society confined to the limits of the state, chemists could not have laws passed referring to chemists. Dr. J. W. E. Harrison at one time made

a study of these state laws.

Upon motion made and seconded, a vote of thanks was given to The American Cyanamid and Chemical Co. for its contribution of \$300 to the Annual Meeting in Chicago; and to Universal Oil Products for its contribution of \$331.00 toward printing expenses for the Annual Meeting.

Upon motion made and seconded, Professor C. S. Williamson of Tulane University was elected to life membership.

Upon motion made and seconded, the following new members were elected:

FELLOWS

Ashman, George C.

(1943), *Research Chemist*, The Minor Laboratories, 9 S. Clinton Street, Chicago, Illinois.

Baird, Ronald J.

(1943), *Research Chemist*, Pennsylvania Sugar Co., 1037 N. Delaware Avenue, Philadelphia, Penna.

Botti, Edmond C.

(1943), *Research Chemist*, E. I. du Pont de Nemours, 256 Vandercor Street, Newark, N. J.

Chatenever, Alfred

(1943), *Chemist*, Matam Corporation, 45-17 Pearson Street, Long Island City, New York.

Dobkiewicz, Hedwig Marie

(1943), *Research Chemist*, Pennsylvania Sugar Company, 1037 N. Delaware Avenue, Philadelphia, Penna.

Drewsen, Pierre

(1943), *Chemical Engineer*, The Hinde & Dauch Paper Co., Sandusky, Ohio.

Fligor, Kermith K.

(1943), *Process Engineer*, Bakelite Corporation, Bound Brook, N. J.

Hanslick, Roy S.

(1943), *Chemical Engineer*, U. S. Bureau of Agriculture, Eastern Regional Research Lab., Chestnut Hill, Philadelphia, Penna.

Hechenbleikner, Ingenuin

(1943), *Research Chemist*, American Cyanamid Co., Stamford, Conn.

Houghton, Dorothy

(1943), *Assistant Professor of Home Economics (Chemistry)*, Teachers College, Columbia University, N. Y.

Hunter, James Hayworth

(1943), *Vice-president in Charge of Production*, Columbia Recording Corporation, Bridgeport, Conn.

Keating, Kenneth J.

(1943), *Factory Manager and Technical Director*, General Paint Corporation, Tulsa, Oklahoma.

Kozak, V. J.

(1943), *Chemist*, (Technical Sales Service), American Cyanamid and Chemical Corporation, Stamford, Connecticut.

Krewson, Charles F.

(1943), *Associate Chemist*, Bureau of Agricultural and Industrial Chemistry, USDA, Chestnut Hill Sta., Philadelphia, Penna.

Kumins, Charles A.

(1943), *Research Chemist*, Interchemical Corp., 432 W. 45th Street, New York N. Y.

Larmour, Harry M.

(1943), *Chief Chemist*, Yosemite Portland Cement Corp., Box 799, Merced, Calif.

Leeds, Morton W.

(1943), *Research Chemist*, Interchemical Corporation, 432 West 45th Street, New York, N. Y.

Morgan, Coleman P.

(1943), *Chief Chemist*, The Vulcanized Rubber Company, 5 S. Pennsylvania Avenue, Morrisville, Penna.

Patton, Alva R.

(1943), *Professor and Head*, Chemistry Research Department, Montana Experiment Station, Bozeman, Mont.

Raimond, William A.

(1943), *Research Chemist*, Calco Chemical Div., American Cyanamid Co., Bound Brook, N. J.

Santoro, Wilfred E.

(1943), *Chief Chemist*, Standard Varnish Works, Elm Park, S. I., New York.

Schaefer, K. T.

(1943), *Superintendent of Textile Laboratory*, North American Rayon Corp., Elizabethton, Tennessee.

Steinberg, Ralph H.

(1943), *Chemist*, Carnegie-Illinois Steel Corp., 3426 E. 89th Street, Chicago, Illinois.

Swain, Ansel P.

(1943), *Assistant Chemist*, U.S.D.A., Eastern Regional Research Lab., Chestnut Hill Station, Philadelphia, Pennsylvania.

Tausz, Jenoe Eugene

(1943), *Research Chemist*, L. Sonneborn Sons, Inc., 88 Lexington Avenue, New York, N. Y.

Tausz, Marta

(1943), *Pierre Diamond Importing Co.*, 630 Fifth Avenue, New York, New York.

Tomlinson, William R.

(1943), *Chemist*, Picatinny Arsenal, Dover, N. J.

Treadway, Robert H.

(1943), *Associate Chemical Technologist*, Eastern Chemical Research Lab., USDA, Chestnut Hill, Philadelphia, Penna.

Yoran, Calvin S.

(1943), *Chief Chemist*, Wishnick-Tumpeer, Inc., 6200 West 51st St., Chicago, Illinois.

ASSOCIATES**Abbot, Ruth**

(A.1943), *Research Chemist*, Physics Section, Calco Chemical Div. of American Cyanamid, Bound Brook, New Jersey.

Doherty, David G.

(A.1943), *Assistant Chemist*, USDA, Eastern Regional Research Lab., Chestnut Hill, Philadelphia, Penna.

Fahrenbach, Marvin J.

(A.1943), *Research and Development Chemist*, Calco Chemical Div. of American Cyanamid, Bound Brook, New Jersey.

Mellon, Edward F.

(A.1943), *Assistant Chemist*, Eastern Regional Research Lab., USDA, Chestnut Hill, Philadelphia, Penna.

Morris, William N.

(A.1943), *Assistant Supervisor of Labs.*, Atlas Powder Co., Weldon Spring Ordnance Works, Weldon Spring, Mo.

Polakoff, Nathan

(A.1943), *Chemist*, Wood and Selick, Inc., 36 Hudson Street, New York, N. Y.

Pollock, Dorothy L.

(A.1943), *Chemist*, Calco Chemical Division of American Cyanamid, Bound Brook, N. J.

Williams, Gordon M.

(A.1943), *Research Chemist*, New Wrinkle, Inc., 314 West First Street, Dayton, Ohio.

JUNIORS

Riener, Thomas W.

(J.1943), *Assistant Chemist*, Resinous Products and Chemical Co., Bridesburg, Philadelphia, Penna.

There being no further business, adjournment was taken.

August Meeting

A meeting of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS was held on Monday, August 2, 1943, at The Chemists' Club, 52 East 41st Street, New York, N. Y., at 6:30 p.m. President Gustav Egloff presided.

The following officers and councilors were present: Messrs: G. Egloff, H. L. Fisher, R. J. Moore, R. E. Kirk, H. S. Neiman, D. Price, J. M. McIlvain, F. D. Snell, A. Lloyd Taylor, and M. Toch. Mr. T. S. McCarthy and Miss V. F. Kimball were present.

The minutes of the preceding meeting were approved.

The Secretary reported that 1779 members now belonged to the INSTITUTE.

Upon motion made and seconded, the following new members were elected.

FELLOWS

Blish, Morris J.

(1943), *Director of Research*, Amino Products Company, Rossford, Ohio.

Callaway, J. B.

(1943), *Research Chemist*, E. I. du Pont de Nemours and Company, Newark, N. J.

Hamm, Homer A.

(1943), *Chief of Chemical Research*, Talon, Inc., 461 8th Avenue, New York, N. Y.

Kubie, William L.

(1943), *Research Chemist*, Barrett Division, Allied Chemical and Dye Corp., River Road, Edgewater, N. J.

Mackinney, Herbert W.

(1943), *Research Chemist*, Bakelite Corporation, 230 Grove Street, Bloomfield, N. J.

Mazzucchelli, Arthur P.

(1943), *Research Chemical Engineer*, Bakelite Corporation, 230 Grove St., Bloomfield, N. J.

Mueller, Arthur S.

(1943), *Chief Chemist*, United Merchants and Manufacturers Management Corp., 601 W. 26th Street, New York, N. Y.

Neville, Harvey A.

(1943), *Head of Department of Chemistry*, Lehigh University, Bethlehem, Pennsylvania.

Payne, Ruth L.

(1943), *Chief Chemist*, Connecticut Telegraph and Elec. Div., Great American Industries, Inc., Meriden, Connecticut.

Prosser, William R.

(1943), *Junior Assistant Plant Superintendent*, Kirkman and Son, Div. of Colgate-Palmolive-Peet Co., 215 Water St., Brooklyn, N. Y.

Redfern, Sutton

(1943), *Research Chemist*, The Fleischmann Lab., Standard Brands, Inc., 810 Grand Concourse, N. Y.

Rich, Paul C.

(1943), *Chemical Engineer*, Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.

Taylor, William

(1943), *Assistant, Chief Chemist*, R. H. Macy and Co., 47-09 30th St., L. I. C., New York.

Veltman, James H. F.

(1943), *Industrial Fellow*, Mellon Institute of Industrial Research, Pittsburgh, Penna.

Zimmerli, William F.

(1943), *Vice-president*, General Aniline and Film Corporation, 230 Park Avenue, New York, N. Y.

ASSOCIATE

Seeger, Doris R.

(A.1943), *Research Chemist*, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

JUNIORS

Fanitzky, Johnathon B.

(J.1943), *Chemist*, Universal Oil Products Company, Riverside, Ill.

Moreau, Fernand, Jr.

(J.1943), *Research Chemist*, Oakite Products, Inc., 22 Thames Street, New York, N. Y.

Upon motion made and seconded, the following Fellows were reinstated to membership:

Jarvis, Ernest G.

(1943), *President and General Manager*, Niagara Falls Smelting and Refining Corp., 2208 Elmwood Avenue, Buffalo, N. Y.

Margolin, Mordecai

(1943), *Chemist*, Dept. of Purchasing Testing Labs., 480 Canal Street, New York, N. Y.

Upon motion made and seconded, Rufus V. Jones was raised from Associate to Fellow.

Upon motion made and seconded, Malvern J. Hiler was raised from Junior to Fellow.

The Secretary read a letter from J. B. Lowe, and he was requested to send a copy of this letter to each of the councilors.

Mr. McCarthy reported on plans for improving THE CHEMIST as to layout and contents, and advertising.

The importance of a general manager was discussed.

Dr. Foster D. Snell reported on the present status of the licensure bill for chemists.

There being no further business, adjournment was taken.

Applications for Membership

For Fellows

Anderton, Benjamin A.

Supervisor, Bituminous Materials, Barrett Division, Allied Chemical and Dye Corporation, Edgewater, N. J.

Barrick, L. D.

Chemist, General Aniline and Film Corporation, Grasselli, New Jersey.

Chalupski, Victor

Chemical Engineer, E. I. du Pont de Nemours & Co., 256 Vanderpool Street, Newark, New Jersey.

Field, Theodore Estes

Director of Research, Corhart Refractories Co., 1600 West Lee Street, Louisville 10, Kentucky.

Flett, Lawrence Hugo

Group Leader, National Aniline Division, Allied Chemical and Dye Corporation, 1051 Park Avenue, Buffalo, N. Y.

Jones, Haydn

Research Associate, Clinton Laboratories, Box 1991, Knoxville 9, Tenn.

Monks, James W.

General Manager, Poughkeepsie Dye-stuff Corporation, 77 North Water St., Poughkeepsie, New York.

Shepard, Bernard J.

Chemical Division Manager, Packing Products Company, 271 Church Street, New York, N. Y.

Sleichter, George Mowery

Professor of Chemistry, The Cincinnati College of Embalming, 3202 Reading Road, Cincinnati, Ohio.

Stamberger, Paul

Senior Chemical Engineer, U. S. Department of Agriculture, Eastern Regional Research Laboratory, Chestnut Hill Station, Philadelphia, Penna.

*For Associates***Jones, Llewellyn**

Research Chemist, Hizone Products, Wilmette, Illinois.

Joy, Homer van B.

Research Chemist, Montclair Research Corporation, 4 Cherry Street, Montclair, New Jersey.

Siggia, Sidney

Research Fellow, Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn, N. Y.

Staub, John H.

Research Chemist, Barrett Division of Allied Chemical & Dye Corporation, Margaret & Bermuda Streets, Philadelphia, Pennsylvania.

*For Juniors***Albert, John R.**

Research, National Lead Company, 105 York Street, Brooklyn, N. Y.

Kinneberg, Ivar H.

Research Chemist, Universal Oil Products Co., Drawer C, Riverside, Illinois.

Riley, William Clay

Bacteriological Chemist, Crown Cork & Seal Company, Highlandtown, Baltimore, Maryland.

Stein, Sidney J.

Chemist, Amecco Chemical Company, 75 Rockwood Street, Rochester, N. Y.

West, Samuel Richard

Chemist, Rocky Mount Arsenal, Denver, Colorado.

To be raised from Associate to Fellow

Shull, Kenneth E.

Chief Chemist, Philadelphia Suburban Water Company, 762 Lancaster Avenue, Bryn Mawr, Pennsylvania.

CHAPTERS

Chicago

Chairman, Hilton I. Jones

Vice-chairman, H. R. Kraybill

Secretary-treasurer, Charles L. Thomas

*Universal Oil Products Company
Riverside, Illinois*

Council Representative, Howard Adler

The Chapter met at Huyler's Restaurant, 310 South Michigan Avenue, Chicago, on July 9, 1943. Dr. Van-

derveer Voorhees presided.

The Secretary was instructed to cast a unanimous ballot for the fol-

lowing men for the nominated officers for 1943-44, there being no contested offices.

Dr. H. I. Jones, Chairman.

Dr. H. R. Kraybill, Vice-chairman.

Dr. C. L. Thomas, Secretary-treasurer.

Dr. Howard Adler, Chapter Representative to the National Council.

Member of Council: Mr. Albert Epstein, Mr. R. B. Harper, Dr. Martin de Simo, Dr. A. W. Ralston, Mr. F. B. Burns, Dr. V. I. Komarewsky, Dr. M. F. Dull.

(Dr. V. Voorhees, the retiring chairman, will be automatically a member of the Council.)

Dr. Egloff then spoke on "How Can THE INSTITUTE Be of More Service to the Chemist." The following were the pertinent points in Dr. Egloff's talk:

1. He wants THE INSTITUTE to do more for the professional chemist.

2. For THE INSTITUTE to do all that it should for the chemist a full-time, paid manager is needed. The burden is too great to be adequately carried by part-time volunteers.

3. THE INSTITUTE is moving to new quarters.

4. Aid is being sought to get more advertising for THE CHEMIST.

5. The National Association of Manufacturers' attempts at post-war planning were praised. THE INSTITUTE could well begin to make such plans so that chemists will not be out of work at the end of the war.

6. THE INSTITUTE can pay closer attention to the chemist in his job so that the chemist is neither forced into a labor union nor maneuvered into the position of desiring to join a union because the union can do more for him than his professional society.

Discussion

Dr. H. I. Jones thinks that the chemist will fare better if licensed.

Dr. Otto Eisenschiml thinks that the chemist will fare better if more people know about chemists and their work. He suggested a committee of three young, aggressive, dissatisfied chemists. It would be the duty of such a committee to make persons in responsible positions aware of the errors they are making or things that they are missing by not consulting a chemist. For example, if a newspaper publishes a summary of "man in the street" interviews on synthetic rubber and it turns out that there is not a single chemist among those consulted, this committee would point it out to the editor. Magazine articles, advertisements, etc., are also raw material for such a committee.

Dr. Eisenschiml pointed out the numerous articles that appear on the marvelous progress of chemistry, plastics, synthetic rubber, synthetic drugs, etc. The committee should try to impress on the editors and writers of such articles that chemistry progresses only because chemists push it forward by hard work and not by magically pulling the finished product out of a

hat. The total progress of chemistry is made up of the contributions of the individual chemist. Are not these individuals and their contributions the real news? Is not news "who, what, when, where, why"? Are not the writers and editors omitting the *who* from chemistry articles?

Dr. B. S. Friedman raised the question of THE INSTITUTE trying to do something for the chemist in his relations with his employer if the chem-

ist needs aid. Many chemists employed in industry see their fellow workers who are not professional men get higher wages and privileges because their union bargains for such workers. Should the chemist forego good wages because he is a professional man and is above forming a union? Should not an institute of professional chemists do something for such industrially employed chemists? Is it doing anything now?

New York

Chairman, M. L. Hamlin

Vice-chairman, Franklin H. Bivins

Secretary-treasurer, Lloyd W. Davis

National Oil Products Company
Harrison, New Jersey

Council Representative, A. Lloyd Taylor

Niagara

Chairman, L. M. Lawton

Vice-chairman, George W. Fiero

Secretary, Margaret C. Swisher

Department of Chemistry
University of Buffalo
Buffalo, New York

Council Representative, Arthur W. Burwell

Carl H. Rasch, *Alternate*

Pennsylvania

Chairman, Clinton W. MacMullen

Vice-chairman, Glenn E. Ullyot

Secretary-treasurer, Kenneth E. Shull

23 Bala Avenue

Bala Cynwyd, Pennsylvania

Council Representative, John M. McIlvain

The Pennsylvania Chapter held the final meeting of the 1942-43 season on Tuesday, April 27th, at the Christian Association Building.

There being no nominations from the floor, the following officers, as proposed by the Nominating Committee, were unanimously elected for the coming year: Chairman, Dr. Clinton W. MacMullen, Rohm and Haas Co.; Vice-chairman, Dr. Glenn Ullyot, Smith, Kline, and French Co.; Secretary-treasurer, Mr. Kenneth E. Shull, Philadelphia Suburban Water Co.; and Council Representative, Mr. J. M. McIlvain, Atlantic Refining Co.

The speaker of the evening was Dr. J. J. Willaman, chief of the Biochemical Division, Eastern Regional Research Laboratory, U. S. Department of Agriculture. Dr. Willaman discussed "The Chemurgy of Apples and Vegetables."

Everyone is familiar with the common uses of apples—as an edible fruit and as apple juice or cider.

One of the problems of the Eastern Regional Research Laboratory was to develop uses for apple culls, of which there are some twenty million bushels every year.

Apples consist of skin, juice, and pomace. From two thousand pounds of the fruit can be obtained seventeen hundred pounds of juice which, by proper treatment, will produce sixty-eight pounds of alcohol, sixty-eight pounds of acetic acid, and sixty-eight pounds of malic acid; three hundred pounds of wet pomace, from which can be obtained sixty pounds of dry pomace and sixty pounds of pectin. Dry pomace can be used as a food for animals.

Apple juice contains 11 per cent of sugars of which 60 per cent is levulose. By treating the juice with lime to a pH of 8.0, heating to 175° F., and filtering, then acidifying to a pH of 5.0 to 5.5, treating with activated carbon and again filtering, and finally evaporating to 75° Brix, there is obtained a sirup which is an excellent sweetener for coffee, ice cream, pies, cakes, etc.

Recently when tobacco companies found their glycerine allotment greatly cut, and knowing that levulose is an excellent humectant, they decided to try apple sirup. They found this to be an excellent substitute, and are now clamoring for ten million pounds.

A large amount of vegetable material is wasted every year. The waste from one 35,000 acre farm in New Jersey is 50,000 tons a year. This does not include produce left in the fields.

From these wastes may be obtained large quantities of protein, fats, riboflavin, carotene, etc. The leaves of beets, broccoli, rutabaga, turnip, and spinach all run over 30 per cent protein, from 6-10 per cent crude fiber, and from 4-6 per cent of fat. Their carotene content is from 250 to 700 gammas per gram.

For the preparation of carotene and riboflavin concentrates it was decided, as the result of a survey, to utilize twelve vegetable leaf wastes. These were beet leaves, broccoli leaves, leaves of various kinds of cabbage, carrot tops, celery tops, lima bean leaves, parsnip leaves, rhubarb leaves, rutabaga tops, sweet corn leaves, turnip tops, and spinach wastes.

The first part of the process consists in separating the leaf blades from the stems. This is accomplished

by subjecting the vegetable wastes to heat, which causes the leaf blades to dry quickly and the heavy stems much more slowly. The partially dried waste is then placed in a rotary screening device which causes the brittle leaf fractions to pass through and leaves the wet stems inside the screen. One ton of average wet waste yields 183 pounds of separated leaves.

Several procedures have been tried for the extraction of carotene, most of them utilizing countercurrent and Soxhlet type extractors. Carotene is finally separated from chlorophyll, xanthophyll, and certain other fat soluble plant constituents, freed of solvent, and stored in vacuum-sealed bottles.

Dried vegetable leaf wastes contain between two and three times as much carotene per gram of material as does alfalfa leaf meal, which is already being used as a source of this substance in animal feeds.

Dr. Willaman brought with him samples of apple sirup which added real zest to the dinner preceding the meeting.



Dr. L. Waldbauer, formerly with the State University of Iowa, is now research chemist with General Aniline and Film Corporation, Easton, Pennsylvania.

Robert M. Herbst, F.A.I.C., is now director of research of E. Bilhuber, Inc., Orange, N. J. He was formerly professor of organic chemistry at New York University.

Washington

President, L. F. Rader, Jr.

Vice-president, Donald H. Andrews

Treasurer, L. R. Heiss

Secretary, Ernest J. Umberger

207 Albany Avenue, Takoma Park, Maryland

News Reporter to THE CHEMIST, T. H. Tremearne

Council Representative, Albin H. Warth

The Washington Chapter awarded the following student medals for 1943: Milton H. Vanden Berg, University of Maryland; John Frank Tinker, University of Virginia; Hartwell F. Calcote, The Catholic University of America; Edward H. de Butts, Jr., George Washington University; Orville F. Crutchfield, Howard University; and Michael C. Barry, Georgetown University.

Carbide Patents Assigned to Alien Property Custodian

The General Electric Company has assigned thirty-seven patents, originally acquired from Fried Krupp Aktiengesellschaft of Germany, to the Alien Property Custodian. These patents cover cemented or sintered hard carbides. The Custodian also controls sixteen other patents on the same products. Manufacturers may apply for a non-exclusive, royalty-free license, valid for the life of the

patents, from the Office of the Alien Property Custodian, in Washington, District of Columbia.

Brownlee OPA Executive

James F. Brownlee, formerly an official of the General Foods Corporation, has been appointed OPA deputy administrator in charge of price. He will assist Chester Bowles, general manager, in completing the reorganization made necessary by the Congressional ban on persons in policy-making positions who lack business experience. Mr. Brownlee succeeds Donald H. Wallace, who has been acting deputy administrator since the resignation of J. Kenneth Galbraith in June.



Mrs. Joseph McEwen, wife of the late Mr. McEwen, F.A.I.C., is doing research in biochemistry toward the Ph.D. degree at Chapel Hill, North Carolina.

Murphy on Research Council

Walter J. Murphy, F.A.I.C., editor of *Industrial and Engineering Chemistry*, has been appointed a member of the National Research Council, Division of Chemistry and Chemical Technology.

General Foods' Research Personnel Increased

General Foods Corporation, with central laboratories at Hoboken, New Jersey, has appointed the following to its research staff: Dr. John H. Lutz, formerly at Massachusetts Institute of Technology, as research staff project leader in charge of packaging research; Millard O. Ricker, formerly with Trojan Powder Company, Sandusky, Ohio, as project leader in the engineering research section. Dr. Harold S. Levenson, former research project leader, has been appointed division head in the physical chemistry section. Roy H. Walters, has been appointed director of engineering research. He has been with General Foods since 1934.

Wood for Metals in Ships

Strategic metals in the amount of 5,297,076 tons have been replaced in the construction of ships by the use of 5,249,774,000 board feet of lumber and 456,808,600 square feet of plywood, according to the National Lumber Manufacturers' Association.

Alabama University Gets Research Grant

The Alabama legislature passed at its recent session a bill appropriating \$100,000 annually to the University of Alabama for research. This was in addition to the usual appropriations for maintenance, new buildings, property, etc.

It is expected that a large part of this money will be devoted to research in chemistry.

Research Fellowships Open

The Alabama Research Institute organized by T. W. Martin of the Alabama Power Company through the agency of the State Chamber of Commerce is setting up research fellowships in the university and other state colleges. These will be mostly in chemistry and the related natural sciences.

Columbia Honors Egloff

Gustav Egloff, President of THE INSTITUTE, received the 1943 award of the Columbia University Medal of Merit, which was presented at the convocation of the university on June first.



Arthur J. Norton, F.A.I.C., consultant for several years to the synthetic resin, plastics, and other chemical industries, has moved his laboratory to Seattle, Washington, from Portland, Maine.

Chemical Industry Medal Awarded to Dr. Grebe

The Chemical Industry Medal for 1943, will be awarded to Dr. John J. Grebe, F.A.I.C., director, Physical Research Laboratory of the Dow Chemical Company, Midland, Michigan, at a meeting of the American Section of the Society of Chemical Industry, to be held in New York, N. Y. in November. The award is made for valuable application of chemical research to industry. Dr. Grebe invented the method for the extraction of bromine from sea water, resulting in the establishment of a commercial plant at Wilmington, North Carolina, which has been in successful operation for about ten years. Working in conjunction with Dr. E. O. Barstow and co-workers, Dr. Grebe contributed to the commercial process of recovery of magnesium from sea water. His knowledge of electrometric control made practical the Dowell process for treating oil wells with acid. In this process, deposits which clog the porous rocks are removed, allowing the oil to flow through the rocks.

More recently, Dr. Grebe has led the successful development of styrene, Saran, a synthetic plastic, and butadiene monomer and polymer production. All of these materials have become of major importance in the war effort. His work on styrene has furnished the basis for the production

of the major portion of this material for the synthetic rubber program. He has also been responsible for the development and use of high temperature heat-transfer media, resulting in an improvement in the economic production of power and in the application of high-temperature heat to chemical processes.

Postwar Plans

The National Association of Manufacturers is holding a nation-wide series of regional conferences for postwar planning. The first was held at Cincinnati, June twenty-first. The following week, the Michigan conference was held in Detroit. In August regional conferences were held in Seattle, Portland, San Francisco, and Los Angeles. This month conferences are being held in Philadelphia, Pittsburgh, and other Eastern cities. Dr. Gustav Egloff, President of the INSTITUTE, is one of the outstanding speakers.



Foster D. Snell, Inc., has added to its staff Irving Merdinger, formerly with the U. S. Rubber Company; Madlyn M. Sheldrick, Brooklyn College; Asher Wollison, College of the City of New York, and Agatina Carbonaro, A.M., formerly with the Arabol Manufacturing Company.

The metallurgical laboratories established by Sam Tour during the fourteen years he was vice-president and chemical and metallurgical engineer in charge of the engineering departments of Lucius Pitkin, Inc., 45 Fulton Street, are now being operated under the name of Sam Tour and Company, Inc. Lucius Pitkin, Inc., will continue as analysts, assayers, chemists, consultants, spectroscopists, weighers and samplers, and shippers representatives, with headquarters at 47 Fulton Street, New York, N. Y.

Chemical Industries

Exhibit December 6th to 11th

The Nineteenth Exposition of Chemical Industries to be held at Madison Square Garden, New York, N. Y. from December sixth to eleventh, will show industry sustaining a world-wide war. The purpose of the Exposition is to serve the technical interests of management, chemists and chemical engineers, technologists, and production executives engaged in chemical and allied industries. Admission is by invitation.



J. Rivers Adams, F.A.I.C., divisional sales manager for Westvaco Chlorine Products Corporation, New York, N. Y., has received the commission of captain in the U. S. Marine Corps Reserve. He is at New River, North Carolina, in active service.

Luaces Heads Corporation

E. L. Luaces, F.A.I.C., was elected president and member of the board of directors of Chemical Developments Corporation, Dayton, Ohio.



The Association for Scientific Photography has just been formed in England, to promote the advancement of photography in all branches of science, technology and medicine. Professor J. Yule Bogue, professor of physiology, Royal Veterinary College, is chairman. The secretary is R. McV. Weston, Houndwood, Earley, Salisbury, Wilts.

DOGGEREL

Dogs in shape and size are various;
Colors, markings, multifarious.
Legs—they run from Dachs to
Greyhound;
Ears—from pointed Spitz to Bay-hound;
Hair—from Mexican to Newfoundland,
Shaggier than all in hound-land.
Some are friendly—Collie, Setter;
Some forbidding, need a fetter
Like the Mastiff and Great Dane.
Pugs are stupid; Poms are vain;
Pointers point; Retrievers fetch;
Terriers frisk; and Bulldogs catch.
Dogs may growl, whine, yelp till noon,
Woof, bow-wow, or bay the moon;
Rats and cats they chase and rend,
But they're Man's most faithful friend.
There are few things, as we see,
That Dogs can not do—or be;
Showing every human trait
Except ingratitude and hate.

—Jerome Alexander, F.A.I.C.

Vitamin Research Award Continued by Mead Johnson

Mead Johnson & Company will continue their annual award of \$1,000 for research dealing with the vitamin B complex. A committee of judges from the American Institute of Nutrition will select the recipient.



Sergeant Peter D. Garvan, son of the late Francis P. Garvan, alien property custodian in World War I and former head of the Chemical Foundation, has been reported missing in action by the War Department. He was a tail gunner in a Flying Fortress and failed to return from a raid on Hamburg, July twenty-seventh.



Charles D. Hurd, professor of chemistry at Northwestern University, author of *Pyrolysis of Organic Compounds*, has received the honorary Doctor of Science degree from Syracuse University.

Enemy Patents to Small Plants

Enemy patents, now in the possession of the Alien Property Custodian, are available to the operators of small war plants, it was announced by Brigadier General Robert W. Johnson. Small plants are encouraged to apply to the office of the Custodian for an index of classified patents.

Meeting Dates

Sept. 21-24. Technical Association of the Pulp and Paper Industry. Wartime Service Conference. Palmer House, Chicago, Ill.

Sept. 22. Meeting of National Council. THE AMERICAN INSTITUTE OF CHEMISTS. The Chemists' Club, New York, N. Y. 6:30 p.m.

Oct. 1. Chicago Chapter, AMERICAN INSTITUTE OF CHEMISTS. Testimonial Dinner to Dr. Fred Conrad Koch.

Oct. 6-8. American Oil Chemists' Society. Palmer House, Chicago, Ill.

Oct. 7-9. Optical Society of America. Pittsburgh, Penna.

Oct. 18-21. American Welding Society. 24th Annual Meeting. Hotel Morrison, Chicago, Illinois.

Oct. 18-25. National Metal Congress. 25th Annual Meeting. Palmer House, Chicago, Illinois.

Oct. 28-29. Joint Fuels Conference. A.I.M.E. and A.S.M.E. William Penn Hotel, Pittsburgh, Penna.

Nov. 14-16. American Institute of Chemical Engineers. Pittsburgh, Pennsylvania.

Nov. 26-27. Central Association of Science and Mathematics Teachers. Annual Convention. Palmer House, Chicago, Illinois.

Dec. 6-11. Chemical Industries Exposition. Madison Square Garden, New York, N. Y.

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Patent Developments

Marston T. Bogert, F.A.I.C., was
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visory Board of the *American Year*
Book.W. G. Parks, F.A.I.C., of the chem-
istry department of Rhode Island
State College, spends two days a week
in Washington in connection with
work associated with the Quar-
termaster General's department of the
War Department.John A. Steffens, F.A.I.C., consult-
ing chemical engineer, sends greetings
from the West Indies.

Anderson Leaves War BoardHarvey A. Anderson, deputy direc-
tor of the Conservation Division of
the War Production Board, resigned
August fourteenth to return to his
duties at the Hawthorne Plant, Chi-
cago, of the Western Electric Com-
pany.

EMPLOYMENT

The Officer Procurement Service, Army Service Forces, of the War Department, the sole procurement agency for officers from civil life for all branches of the Army, is at present supplying the Surgeon General's Office with biochemists, industrial hygiene and sanitary engineers. Qualifications are: For biochemists B.S. degree and two years of experience, or M.S. degree and one year of experience. Maximum age limit is fifty. The grades available are second and first lieutenant. For sanitary engineer, the educational requirement is similar, maximum age is 45, and grades available are second lieutenant, first lieutenant, and captain. For industrial Hygiene Engineer, similar educational requirement, four years of experience, age limits 38 to 45, and grades available, first lieutenant and captain.

Government Seeks Business and Industry Analysts

The United States Civil Service Commission has openings for persons who have had executive experience (involving analysis) in business or industry as distributors or manufacturers of foods, textiles, metals, consumer goods, or industrial equipment. The duties if the positions available are to make analyses with regard to distribution and production; to analyze the needs for and

the supply of critical materials, consumer goods, and industrial commodities; to survey the availability of productive capacity, materials, or commodities, and the possibilities of substitution; to work out, after consulting with government agencies and business organizations, balances between requirements and supply. Salaries are from \$2,433 to \$7,128, with few appointments to be made to positions paying \$5,228 and over. There are no age limits. Application forms may be obtained from the Civil Service Commission in Washington, D. C.



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Chemist wanted, experienced in the manufacture of soap, shampoo, etc., and able to do research work on substitution products. Man of middle age preferred. Position in Baltimore. Minimum salary \$3000. Please reply to Box 90. THE CHEMIST.

The state director of Selective Service in the State of Illinois has authorized two-year draft deferments for students in engineering and scientific courses in colleges and universities. Previously deferments had been limited to those who would finish their studies before July 1, 1945.

BOOKS

STRATEGIC MATERIALS. By M. S. Hessel, W. J. Murphy, F.A.I.C., and F. A. Hessel, F.A.I.C. *Hastings House*. 1942. 235 pp. 6" x 8½". \$2.50.

No subject is more important to every American citizen than that indicated by the title of this book. The Nation depends upon the result of the present war and the war depends upon the production of materials necessary for its conduction.

As a peaceful nation our production was limited largely to civilian demands, and our catapultic injection into the war found us entirely unprepared to produce the necessary materials. Never in history has any other nation been required to produce so much in so short a time, and the necessities of the situation demanded a complete change in the country's industries.

Minerals, chemicals, textiles, in fact everything we employed in peace time had to be produced in such increased quantities that all of the raw materials were insufficient and, hence, became critical.

The authors have told this new and

fantastic story in greatest detail, discussing fourteen strategic and fifteen crucial materials, their uses, and their needs for war purposes, with authentic statistics and many pictographic diagrams; and their story is told in a most interesting manner.

War Gas Lecture Available

Otto Eisenschiml, F.A.I.C., has prepared a popular lecture on poison gases for the information of Civilian Defense personnel, which is to be used in connection with "refresher leaflets", to train groups of people who should know what to do in the event of a gas attack. Copies of the lecture and leaflet may be obtained free by those who are in charge of civilian defense work. Please send the request directly to Dr. Eisenschiml at 1637 South Kilbourn Avenue, Chicago, Illinois.



Dr. W. G. Eversole has been granted a leave of absence from the University of Iowa to accept a position with Linde Air Products Company, Buffalo, N. Y.

A MANUAL FOR EXPLOSIVES LABORATORIES. Volume II. Explosive Compounds and Allied Substances. A Descriptive List. By G. D. Clift and Dr. B. T. Fedoroff. *Lefax Society, Inc.* 1943. Pocket size. 135 pp. $3\frac{7}{8}$ " x 7". \$2.25.

This pocket volume, a continuation of the laboratory technique treated in Volume I, lists alphabetically the compounds and mixtures used in the explosives industry, and in addition, auxiliary and associated materials. Many references to the literature are given, and the listing is very complete. It stands by itself as a reference volume, and in conjunction with Volume I is essential to anyone interested in or connected with the explosives and pyrotechnic industry.



THE NEW CHEMICAL FORMULARY.

By H. Bennett, F.A.I.C. *Chemical Publishing Company.* 1943. 635 pp. 9" x 5 $\frac{1}{2}$ ". \$6.00.

The sixth volume of this well-known compendium of practical formulas adapted for every possible use has just been issued.

The various volumes of this valuable series of formulas are not simply new editions of each other, but each is a collection of recipes not found in the former volumes, and thus each represents a set of new formulas based upon later researches and discoveries.

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It contains thousands of latest tested formulas, which will prove of the greatest value, especially in these days when our former processes of conducting our affairs must be discontinued because of war conditions, and when economy is an important element in all of our activities.



THE CHEMISTRY OF LARGE MOLECULES. Edited by R. E. Burk and Oliver Grummitt. *Interscience Publishers.* 1943. 308 pp. 9 $\frac{1}{4}$ " x 6 $\frac{1}{4}$ ". \$3.50.

This book is Volume I of a series to be published with the title "Frontiers in Chemistry", under the auspices of Western Reserve University, and it presents the present knowledge of this continually expanding group of chemicals.

The chapters are devoted to the mechanism of polyreactions, the colloidal behavior of organic micro-molecular materials, their electrical and elastic-viscous properties, their investigation with X-Rays and the organic chemistry of vinyl polymers,

with an excellent review of the chemistry of cellulose and cellulose derivatives.

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SEMI-MICRO QUALITATIVE ANALYSIS.

By Paul Arthur and Otto M. Smith.
McGraw-Hill. 1942. 322 pp. 6" x 9". \$2.75.

In this textbook, the subject matter is divided into two parts. Part I, on theory, is confined to the physical chemistry of solutions, and it avoids crystallographic and spectrographic theories. Part II is a description of the technique of the formation of precipitates and their separation by centrifugal and special micro-filtration methods. The book is a definite contribution to the art of determinative analysis.

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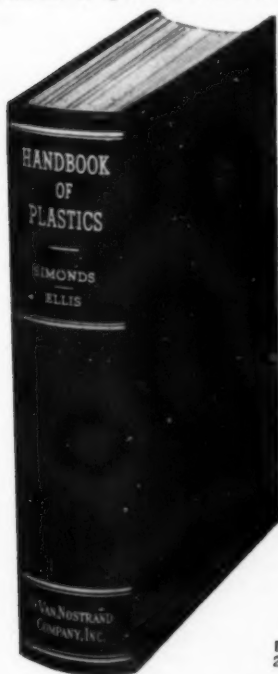
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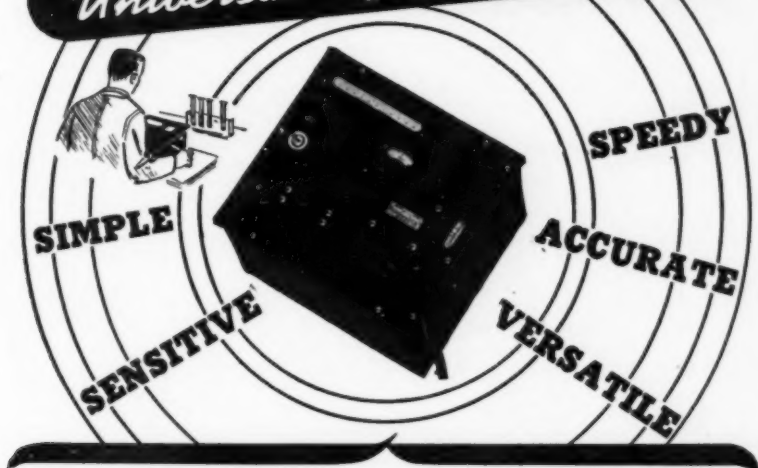
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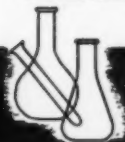
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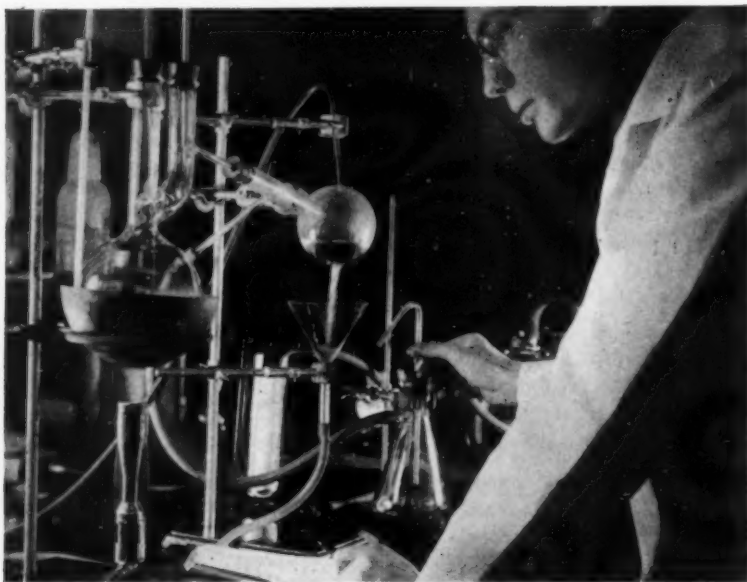
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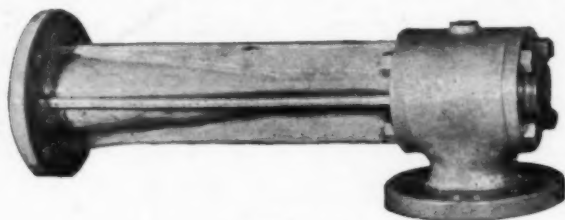
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